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Original Communications

DIFFUSE ADENOMYOMA OF THE UTERUS: CONDITIONS INFLUENCING ITS DEVELOPMENT*

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ADENOMYOMA forms one of the most interesting chapters in gynecologic pathology. Its distribution and classification, both uterine and extrauterine, have recently received much attention. Of all types of adenomyoma there is none so common as diffuse adenomyoma of the uterus, and the frequency of the lesion can only be realized by those who study uteri from a microscopic standpoint. When one examines a stained section of uterine wall in which there are present numerous penetrating islands of uterine mucosa several questions immediately present themselves. Several of these are most important. First: What is the origin of the glands? Secondly: What is responsible for their presence in this abnormal situation? Thirdly: What is the nature of the diffuse thickening of the uterine wall and what are its chief characteristics? Fourthly: Is it a tumor, or how should it be classified?

The question as regards the classification of the lesion, particularly whether it deserves the name of tumor or whether it should be considered as a type of hyperplasia has received considerable attention. As a result of various views, apparently the same lesion has been assigned several different terms. Frankl, in 1914, points out that adenomyoma is frequently confused with so-called adenometritis,

*Read at a meeting of the New York Obstetrical Society, January 10, 1922.

adenomyositis, adenomyometritis and adenoma diffusum. He suggests that the term adenomyoma should be reserved for those lesions which are definitely circumscribed and contain glands; adenometritis for those conditions in which the diffuse thickening with its contained glands is associated with inflammation, which Robert Meyer feels is the basis of explanation for most cases. Frankl states that he has seen cases in which there was absolutely not the slightest evidence of inflammation and suggests the term adenomyosis for such cases.

Strong, of New York, in a recent paper, discusses the same question and points out similarly the shortcomings of the term adenomyoma, and although the title of his paper is adenomyometritis, not adenomyoma, he does not suggest adenomyometritis for general application. Strong also refers to irregular penetrations of the uterine glands of the basalis into the myometrium. He tells us that these are quite common and are most important because they have a distinct bearing on the causation of so-called adenomyoma. These penetrations according to this author, are present to a greater or lesser degree in all uteri, and are extensive in proportion to the amount of inflammation, hyperplastic, or sometimes atrophic change that is present in the endometrium or the myometrium. It has been our experience also, that the endometrium has a very definite tendency to penetrate the myometrium in a large percentage of cases. This is strikingly brought out in the routine microscopic study of uteri removed at operation. Our experience has been that this occurs to a more marked degree in uteri of women that have borne children. Just how extensive this penetration should be, as to whether it should be disregarded or the lesion classified as a so-called adenomyoma is difficult to say. Perhaps an additional factor to consider would be the reaction of the myometrium in the vicinity of this penetrating tissue, in other words, the degree of the myometrial hyperplasia.

It is not our purpose in this paper to review the various theories as regards the origin of the glands in adenomyoma. First, because Lockyer has done this so ably in his recent monograph, and secondly, because we are not dealing with adenomyoma as a whole, but have confined our study only to the diffuse type of the uterine wall.

Although earlier there was a good deal of discussion as regards the origin of the glands in diffuse adenomyoma of the uterus, at the present time the mucosal origin which was first suggested by Cullen and definitely proved by him, is generally accepted. Frankl, in 1914, states other sources of origin for this type of lesion need scarcely be considered. Lockyer in his recent comprehensive review of adenomyoma, discusses at great length the etiologic theories which have been suggested and emphasizes particularly Cullen's mucosal theory. Of particular interest in this connection is the abstract which he gives of

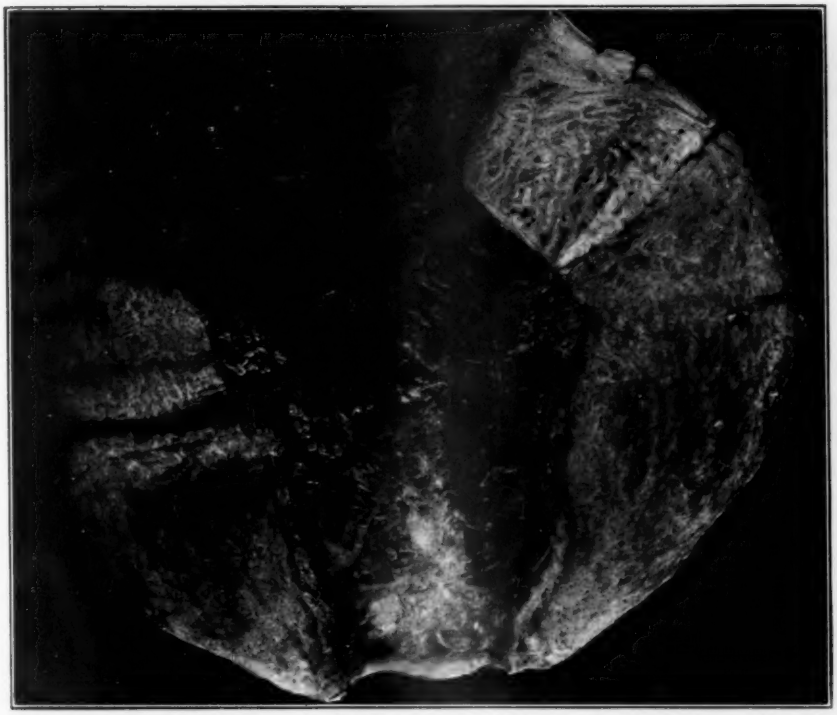

Fig. 1.—Diffuse adenomyoma associated with hyperplasia of the endometrium. Case 1299. Nulliparous uterus, supravaginal portion. Marked diffuse thickening of uterine wall—numerous dilated glands present in uterine wall in upper right portion. Only slight penetration in lower half. Marked hyperplasia of the endometrium.

Fig. 2.—Section taken from upper right portion of Fig. 1. Shows numerous glands similar to glands in hyperplasia of the endometrium, which was very striking in this case.

Robert Meyer's latest views regarding the causation of uterine adenomyoma. Meyer tells us that the mucous membrane sends hyperplastic and hypertrophic glands into the uterine muscularis. While the surface layers as a rule are not hyperplastic, and frequently even atrophic, according to Meyer these bits of invading mucosa follow the muscular interstices and the lymph vessels, but do not penetrate the lymph spaces. The invasion, he states, is postfetal, and is a disease of the adult uterus. In this connection Meyer studied one hundred uteri from fetuses, newborn, and girls up to fourteen years of age, and stated that the mucosal projections are seldom seen, and when they do occur it is only singly. We, personally, have examined a great number of similar uteri but have never been impressed with any definite tendency of the endometrium to penetrate the myometrium in such cases. It is quite characteristic of the endometrium of the fetal uterus of about thirty-six weeks' gestation to show only a few layers of cells lining the cavity, from which are differentiated the endometrium, both stroma and uterine glands. There is usually at this time of development no evidence of gland formation. Meyer feels that the invasion of the mucosa is favored by the absence of a true submucosa in the uterine wall and suggests that as a result, mechanical lesions such as might occur after therapeutic means, gestation and inflammation, the intrafascicular connective tissue is incapable of resisting the entrance of the mucosal element.

Cullen, in his elaborate monograph of 1908 on uterine adenomyoma, discusses the question of the causation of diffuse adenomyoma in one short paragraph. He mentions that probably pregnancy with its incident extensive stretching of the uterus might leave crevices in the uterine wall into which the mucosa could later flow. He states, however, that fifteen out of forty-nine patients were never pregnant, and with pregnancy as a possible factor, other causes must be considered for the appearance of the lesion in the nulliparous uteri. Cullen remarks that a number of cases gave a decided impression that the diffuse myomatous growth was the primary factor. He refers to this as a myomatous tendency by the almost constant presence of discrete myomatous nodules in these cases. He emphasizes the fact that the only pathological change in some cases lies in the extension of the normal glands into crevices throughout the diffuse myomatous growth.

Novak, in a recent paper, mentions the fact that hyperplasia of the endometrium is frequently associated with myoma of the uterus, but even more frequently with adenomyoma. Novak's statements made in a discussion of Dr. Cullen's latest paper on the distribution of adenomyoma are of considerable interest in connection with conditions influencing the occurrence of adenomyoma. Novak has been struck with the relationship which appears to exist between adenomyoma of the

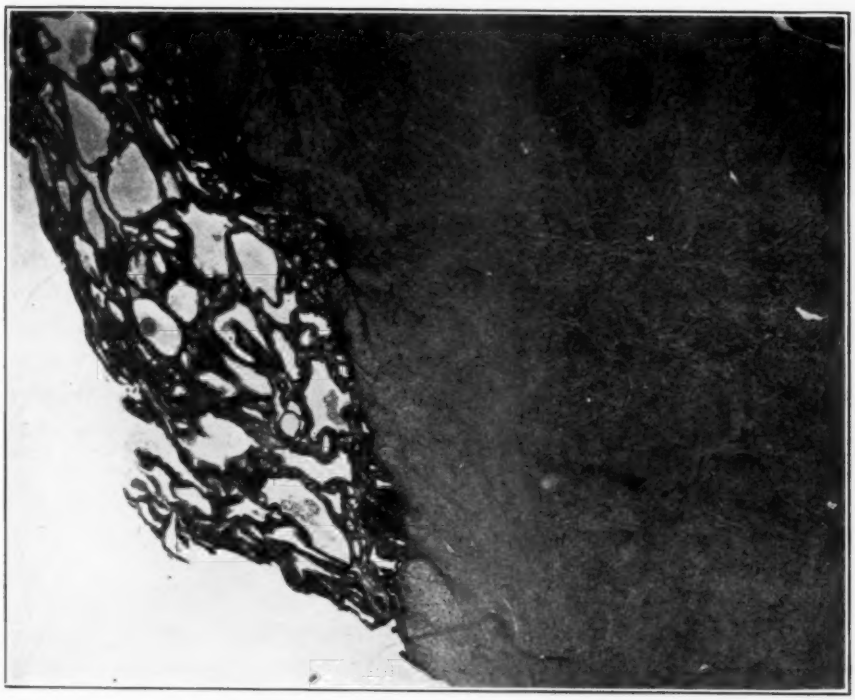

Fig. 3.—Section taken from lower left portion of Fig. 1. Marked hyperplasia of endometrium, shows only a slight tendency to invade. Hypertrophy of myometrium.

Fig. 4.—Myometrium, higher power; same area of myometrium from which Fig. 3 was taken; orcein-Van Gieson stain. Shows nulliparous distribution of elastic tissue. The internal elastic membrane of the arteries stands out well in this picture. The connective and muscle tissues show prominently. The connective tissue is the fine darker tissue between the lighter muscle bundles.

uterus and the condition known as hyperplasia of the endometrium. He points out that hyperplasia of the endometrium was first accurately described by Cullen in 1900. In many cases of adenomyoma of the uterus, according to Novak, the mucous membranes, both of the surface and deep down in the muscular tissue, show the characteristic pattern of hyperplasia. He mentions that both these conditions are characterized clinically by extensive menstruation, and the apparent connection between the two conditions suggests various interesting possibilities. Hyperplasia of the endometrium, as the term indicates,

Fig. 5.—Diffuse adenomyoma associated with hyperplasia of the endometrium. Case 1323—similar to Case 1299 except for one full term pregnancy. No evidence of subinvolution. Marked hyperplasia of the endometrium. Marked diffuse thickening of the uterine wall throughout. Lowest portion of the uterus to right—fundus to left.

is characterized by a genuine increase in epithelial and stromal elements of the endometrium, while adenomyoma, in a broad sense is a hyperplasia of the muscular element. Novak feels that both may be produced by the same underlying cause. He calls our attention to the fact that in recent German literature the inflammatory theory of origin is by far the most popular. This is particularly emphasized as regards the causes of adenomyoma of the recto-vaginal septum. He closed by stating that he merely mentioned these facts in order to lure

Dr. Cullen into a discussion of the cause of these interesting lesions. In closing Dr. Cullen merely stated that the cause of adenomyoma is unknown and that there is no evidence that it is due to inflammation as has been suggested by numerous observers.

We feel rather strongly, that on account of the fact that there has been considerable confusion as regards our knowledge of pathological lesions of the uterine wall, that conditions, if any, favoring the development of diffuse adenomyoma would likewise be more or less confused. In our opinion, however, the recent work of Shaw has definitely cleared up certain types of lesions of the uterine wall. Shaw discusses

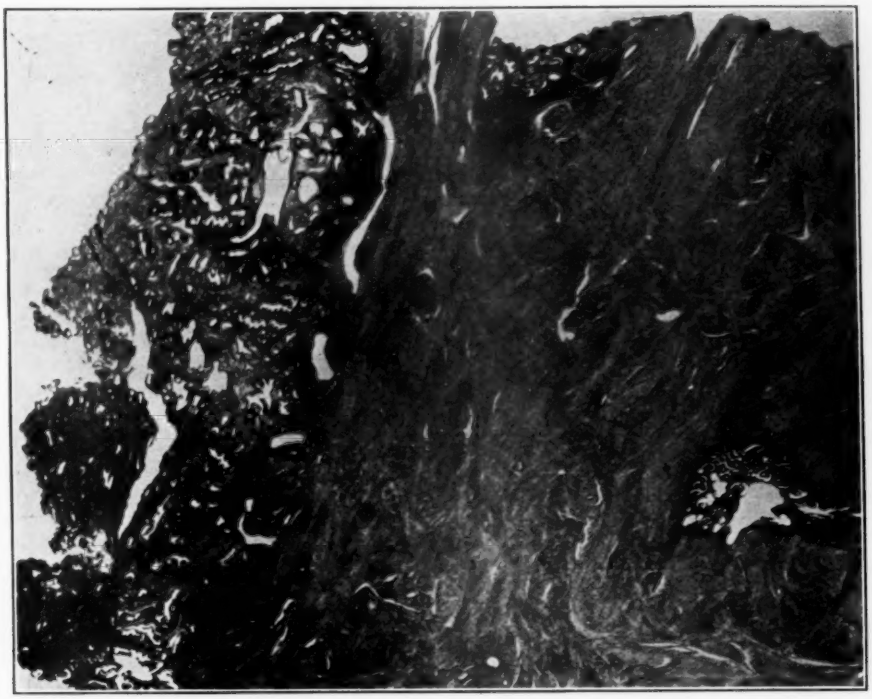

Fig. 6.—Case 1323—low power; showing hyperplastic endometrium and penetration of glands. Structure of myometrium similar to Case 1299, except separation of muscle bundles are more prominent and myometrium coarser looking in the gross.

three lesions, namely, chronic subinvolution, chronic metritis and hypertrophy. Briefly, chronic subinvolution consists of subinvolution of the circulatory system characterized by a diffusion of dead elastic tissue around the walls of the arteries. This material in addition contains unabsorbable portions of the old vessels, a smaller and newer vessel having developed within the old lumen. The veins, particularly the larger ones in the middle third, show a marked increase in this diffused elastic tissue, which has a tendency also to be present between the muscle bundles directly adjacent the veins. Reduplications of the internal elastic membrane in the larger arteries are also a striking

Fig. 7.—Case 1790. Diffuse adenomyoma associated with myomata. Nulliparous uterus. Note the diffuse thickening in the extreme upper portion of the picture.

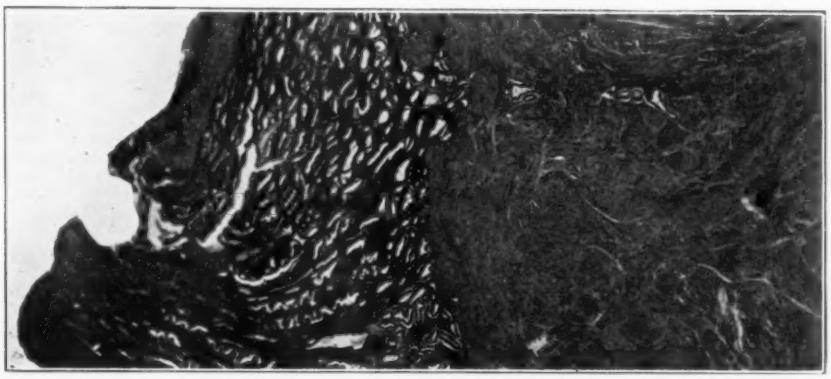

Fig. 8.—Case 1790. Section from area of diffuse thickening in upper portion of Fig. 7. Includes endometrium, which shows definite hyperplasia, and myometrium with several invading glands. Note the definite separation of the muscle bundles.

feature. In the outer third of the uterus between the muscle bundles there is present also a definite increase of this black stained tissue, which, in some instances, is quite excessive. More or less edema is also constantly present. Chronic metritis is a lesion which results from previous active inflammatory process within the uterine wall, and is characterized by a definite increase in connective tissue and small round cell infiltration in the myometrium. If this lesion is present of itself the uteri in most instances are not particularly enlarged and the walls are usually quite firm and cut with considerable resistance. Hypertrophy of the uterine wall is characterized by an increased thickness due to both hypertrophy and hyperplasia of the muscle cells and connective tissue of the uterine wall. This condition is in the nature of a work hypertrophy and, perhaps, is somewhat analogous with hypertrophy of the myocardium under certain conditions. Hypertrophy is chiefly associated with hyperplasia of the endometrium, myomata and also forms a part of the lesion of adenomyoma even to a more marked degree.

Three years ago one of us confirmed the work of Shaw, except that we felt that there was more overlapping of these conditions than his descriptions lead one to believe. Shaw, in a personal communication, referred to this article not as a criticism of his work, but stated that there was very little difference between this work and his, and suggested that it was due rather to the difference of conditions under which the articles were written than to any real difference of view. At the time Shaw wrote his article he used one heading, namely, chronic metritis, and placed the three above mentioned lesions under this one title. He mentioned the fact that the rigid classification which he adopted was due to the fact that he had to emphasize these very distinct types, but realized that there was frequently distinct overlapping. In our opinion Shaw clears up a rather confused subject which should result in the abolishing of a large list of terms referable to lesions of the myometrium.

We know that myomata and hyperplasia of the endometrium frequently accompany diffuse adenomyoma. We felt that a study of a series of cases in which particular attention would be paid to the presence of the conditions described by Shaw, in addition to the presence of myomata and hyperplasia, might lead us closer to an explanation of why the mucous membrane of the uterus penetrates the uterine wall in the lesion of so-called adenomyoma. We, of course, consider that the mucosal origin of the glands in this type of case is proved. This has been shown by serial section, and has been particularly emphasized by Dr. Cullen. Further, because in the early lesions it is very easy to see the connection with the mucosa in almost any single section. We have recently modeled the penetrating islands of mucosa in order to

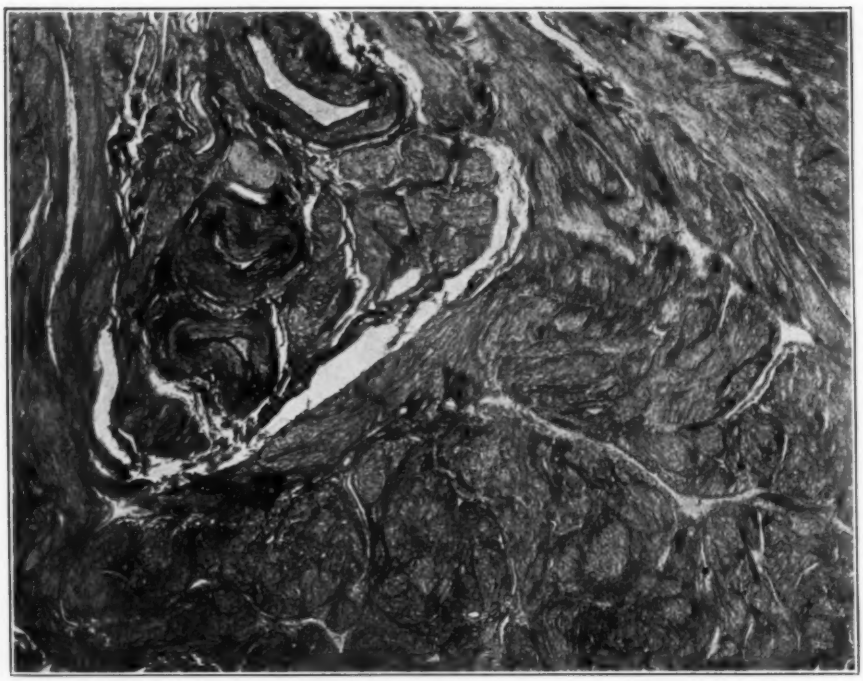

Fig. 9.—Case 1790. Myometrium (orcein-Van Gieson stain) higher power; shows a loose structure, muscle and connective tissue both prominent; nulliparous distribution of elastic tissue. The internal elastic membrane of the arteries stands out clearly; no other elastic tissue evident in the picture.

Fig. 10.—Diffuse adenomyoma of the uterus associated with chronic subinvolution. Case 480. Supravaginal uterus—wall 22 mm., thick, endometrium 1 mm. Diffuse thickening not prominent. Penetration of glands over 1 cm., in myometrium in places.

definitely show the relation to one another and also to the endometrium. Mr. Wm. D. Dieckmann prepared this model in the Obstetrical Laboratory. The model shows very clearly the tendency of the mucosa to invade the myometrium; it also shows how the islands communicate with one another. A large portion of the model, however, could be connected to the endometrium only by a very small strand of mucosa, and we have refrained from publishing this work hoping to use a case which shows the connecting links to a more marked degree.

The fact that we rather frequently made a diagnosis of early adenomyoma of the uterus in routine work caused us to become particularly interested in these early cases. We were also particularly interested in the circumstances under which these lesions started, and in the chief characteristics of the myometrium in these cases.

This paper includes the study of forty-nine uteri in which the lesion of adenomyoma exists, apparently, of itself, or coincident with other lesions. The material for this study was chiefly obtained from the Barnes Hospital. However, we are indebted to H. S. Crossen, Lee Dorsett and George Ives for a considerable number of cases. These were divided into two groups. The first group were those cases in which a definite diagnosis of adenomyoma could be made, the lesion, however, still comparatively early. The second group were those cases in which the lesion was well advanced. In the first group there were twenty-three cases and in the second group there were twenty-six cases. These cases were carefully described in the gross, and celloidin sections were studied, stained with hematoxylin and eosin and also with orcein and Van Gieson's stain. The clinical histories were available in all but four of these cases. Careful attention was paid to the presence of hyperplasia of the endometrium, chronic subinvolution, chronic metritis, hypertrophy and myomata.

The hyperplastic myometrium which is present more or less marked in most cases of adenomyoma attracted our attention first. We shall briefly mention some of the impressions that this study made. In the first place the tissue involved has more the characteristics of hyperplasia than of new growth. These lesions of themselves do not reach the limitless growth that the ordinary discrete myomata do. If they reach any considerable size it is due to a dilatation of the contained glands rather than the result of any enormous hypertrophy of the uterine wall. The hypertrophy of the wall is due both to hypertrophy and hyperplasia of the connective tissue and muscle tissue of the uterine wall. This in the gross appears very much coarser than the normal, and in the gross the individual muscle bundles appear much larger. The amount of connective tissue varies. In almost all cases it is definitely increased. This is most striking, perhaps, in the cases in which intramural myomata are associated with the lesion.

This is prominent in both parous and nulliparous uteri. It is also quite marked in cases which are accompanied by hyperplasia of the endometrium. With this condition the connective tissue content of the wall seems to be more prominent in cases in which the patient had

Fig. 11.—Case 480. Entire wall—low power—Hematoxylin-eosin stain. Shows an atrophic endometrium with glands penetrating one-third of the distance to the serosa.

Fig. 12.—Case 480. Same field as Fig. 11. Orcein-Van Gieson stain. Marked evidence of subinvolution throughout wall, collars of diffused elastic tissue about arteries of inner third, marked amount of diffused elastic tissue between muscle bundles of outer third.

had no children, or, perhaps only one. The same fact may be noted in ordinary hypertrophy of the uterine wall in the absence of adenomyoma. The connective tissue increase is less conspicuous in cases which have had numerous pregnancies and where the invasion of the glands is not particularly marked. In such cases also the entire thickness of the uterine wall may not be markedly increased. It is also quite clear that the increase in connective tissue is in no way referable to the inflammatory process such as we see in chronic metritis because we see no accompanying round cell infiltration in this hyperplastic tissue. We do not recall a clear cut case of chronic metritis which

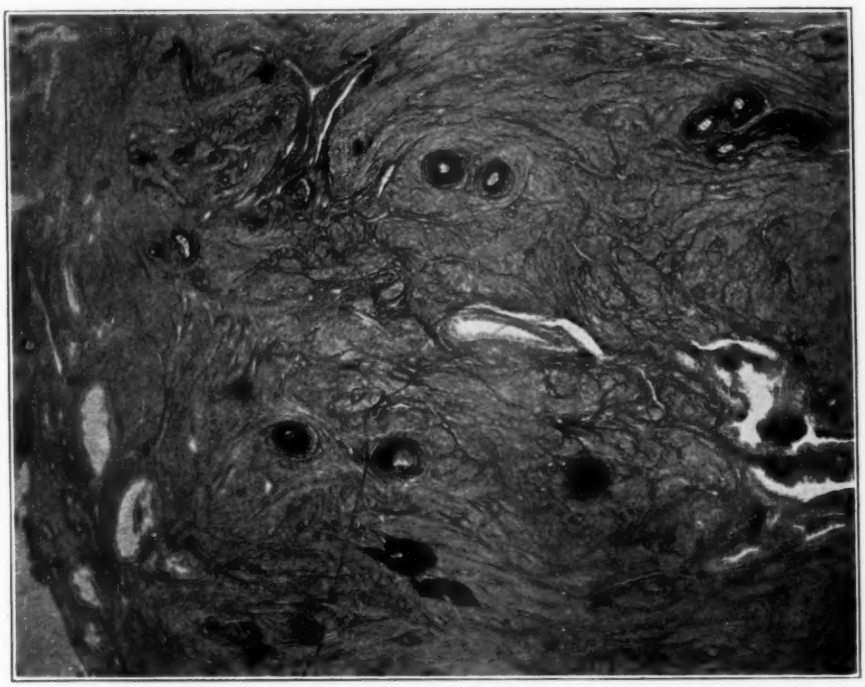

Fig. 13.—Same as Fig. 12. High power. Extreme upper left portion. Shows black collars about numerous arteries; also prominence of connective tissue associated with hypertrophy of the wall.

did not show some definite round cell infiltration in the myometrium.

The individual cells of both muscle and connective tissue are usually somewhat enlarged but are in no way suggestive of being atypical or tumor cells. We have never observed any evidences of degeneration in this tissue. This is in striking contrast to ordinary discrete myomata. This increased connective tissue relation is present in the early lesions and the point which differentiates this tissue from that of early myomata which are noted for their lack of connective tissue in early stages of their development. We have had the opportunity recently to observe the uterus of a nineteen-year-old girl which was

riddled with countless small myomata, from microscopic size to as large as 5 mm., none larger. The absence of fibrous tissue in the smaller tumors was quite striking. Comparing these young tumors with the myometrial hyperplasia of ordinary adenomyoma suggests very strongly that their origin has nothing particularly in common and suggests an origin outside of the muscle or connective tissue of the uterine wall. This strongly suggests the origin from blood vessels, as some writers point out. Our case also points strongly to this source. Dorsett and one of us will report this case in detail at a later date.

In short the condition of the myometrium is a definite hyperplasia of all its constituents quite similar to the lesion of ordinary hypertrophy of the uterine wall. This hyperplasia may be present primarily as a result of the presence of discrete myomata, or due to an accompanying hyperplasia of the endometrium; it may be considered a work hypertrophy. In other instances the glands may invade the myometrium primarily and the hyperplasia result from the presence of the glands, and may be considered an expression on the part of the uterine wall to rid itself of the invading tissue. This involves particularly cases in which subinvolution is the only accompanying lesion.

In classifying the forty-nine cases which were selected in this study, seven groups were arranged. They consisted of groups in which chronic subinvolution, hyperplasia of the endometrium and myomata existed alone; the remaining four groups representing various combinations of these lesions. In the group where subinvolution was present alone there were placed twelve cases. The striking feature of the chronic subinvoluted uterus was very marked in all of these cases with one exception in which it was quite definite. Chronic subinvolution occurred in combination with hyperplasia of the endometrium in eleven cases; in five instances chronic subinvolution and myomata were present and in six instances there was a combination of chronic subinvolution, myomata and hyperplasia. There were four cases in which hyperplasia occurred alone—in each of these instances the hyperplasia was very striking. Two of these cases were classified as early adenomyoma (one perhaps questionable) and the other two were very well advanced cases. Hyperplasia occurred in connection with myomata in five instances—in four of these cases it was quite striking and very definite in the fifth. Myomata occurred alone in six cases. The cases of the last group as a whole were uteri which were studded with numerous small myomata, many nodules being between ½ and 3 cm. in diameter, just the type of uterus in which the accompanying hyperplasia of the myometrium is most strikingly seen. In thirty-four instances subinvolution was present of itself or with these various combinations. Hyperplasia was present of itself or in combination with other lesions in twenty-six cases. Myomata were present of

Fig. 14.—Diffuse adenomyoma with marked chronic subinvolution. Case 1984. Section of inner third of uterus—low power—hematoxylin-eosin stain. Endometrium atrophic. Note the marked irregularity of the endometrium with very marked penetration of strands of mucosa in numerous places; also the numerous blood vessels with thickening walls.

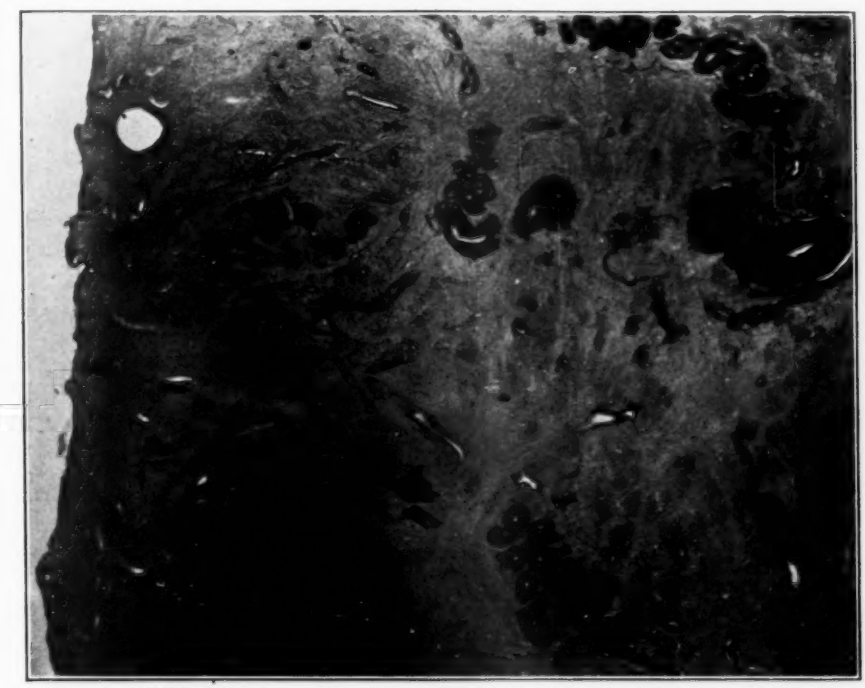

Fig. 15.—Same as Fig. 14. Orcein-Van Gieson stain. Almost every artery in the field shows the characteristic black collar of chronic subinvolution. No hypertrophy of myometrium.

themselves or in combination with other lesions in twenty-one instances. In every one of the forty-nine cases it was possible to place the case under one of these headings. It is readily seen that subinvolution and hyperplasia are by far the most frequent accompanying lesions in this series, subinvolution alone and in combination with hyperplasia occurring in twenty-three cases, and in forty-three cases either one or the other of these lesions existed. In six cases myomata alone were present and in five out of these six cases the patient had borne children. There was not sufficient evidence microscopically of chronic subinvolution but enough to stamp them as parous uteri.

Clinical histories were obtainable in all but four cases; in two or three others it was incomplete. We were particularly interested in the frequency of menorrhagia. In these forty-nine cases there was a definite history of menorrhagia in thirty-one instances. In the chronic subinvolution cases alone out of the twelve cases there were eleven with complete histories, of which six gave a history of menorrhagia. In the cases where subinvolution and hyperplasia existed, histories were obtainable in eight out of eleven cases; in six cases there was a definite history of menorrhagia, in one case the information was doubtful and in another it was negative. In the case of doubtful history the hyperplasia was fairly striking, whereas in the case which was negative there was only a moderate hyperplasia. In five cases of subinvolution and myomata the history was complete in four, of which two were positive for menorrhagia and two were negative. In the cases where all three lesions occurred there were four positive histories and two negative histories as regards increased menstrual flow. In one of these cases the lesion was quite moderate and in the other it was not particularly striking. In the cases of hyperplasia alone there was marked menorrhagia in all four, two of these being nulliparous women, one uniparous and the fourth having had two full term children. In the five cases in which hyperplasia and myomata were present together the history was complete in four cases and showed menorrhagia in all four instances. Where myomata occurred alone four out of six cases had menorrhagia and two gave negative histories.

This résumé as regards the frequency of hemorrhage associated with cases of adenomyoma seems to us to show that those cases which are combined with hyperplasia of the endometrium are most apt to show a definite history of menorrhagia. This is so in our series of which there were twenty-six cases, in all but three instances. In two of these instances the lesion was not particularly striking and in the third instance in which it was fairly striking there was some doubt about the history. It also shows that the cases associated with subinvolution alone or in combination with myomata may quite frequently not be

associated with menorrhagia. Two cases with myomata alone showed no increased bleeding.

So we feel we can say that adenomyoma of the uterus may or may not be accompanied by profuse menstruation. The largest percentage of adenomyoma which consistently gave a history of menorrhagia are found to be accompanied by hyperplasia of the endometrium. We feel that this series shows very strikingly that adenomyoma is very clearly accompanied by other uterine lesions. We thought, however, that a series of forty-nine cases, a few of which were quite early, could not be considered too seriously. We, therefore, thought it a good plan to go over the cases of diffuse adenomyoma of the uterus in Cullen's monograph and see how many could be placed more or less definitely according to the accompanying lesions. This, of course, was difficult because one could not study cases of subinvolution with a special stain. However by placing all cases which showed no other lesion and had a definite history of having had full term children under the heading of subinvolution fairly accurate conclusions could be drawn.

In going over the cases in Cullen's text book, there were forty-seven cases of diffuse adenomyoma, which we reviewed. The placing of these cases in definite groups as in the series just described is obviously difficult and perhaps in a few instances inaccurate, but we felt, perhaps, some comparison and some conclusions could be drawn. There were four cases which were not classified according to this scheme:—Three of these gave no history, and the fourth will be considered by itself. The remaining forty-three cases were placed as follows: Subinvolution alone, five; subinvolution and hyperplasia of the endometrium, four; subinvolution with myomata, five; subinvolution with both myomata and hyperplasia, four; hyperplasia alone, four; hyperplasia and myomata, ten; myomata, eleven. These groups showed that hyperplasia of the endometrium occurred eighteen times of itself or in combination; myomata occurred in all combinations thirty times. The inferential diagnosis of subinvolution in all combinations was made in eighteen cases. This series showed a definite increased incidence of myomata, while the frequency of hyperplasia was slightly less striking and the subinvolution incidence was also less. In these forty-seven cases there were a greater number of nulliparous women. In the hyperplasia cases only one out of the four had no children; in two cases there was no available data. In the hyperplasia-myomata cases there was a definite history of no pregnancies in seven cases, while in the cases of myomata alone two had had children, one case none, and in the remaining cases the clinical data was incomplete.

It was quite evident that menorrhagia was present to a more marked degree than in our series. It occurred in thirty-one instances in Cullen's cases. It was negative for menorrhagia in eight instances and

in the remaining cases no history was obtainable. In the cases of hyperplasia alone it occurred in fifteen instances, one case negative and two gave no histories. In the six subinvolution cases alone, all showed increased bleeding; and in the myomata alone, six out of eleven were positive, three negative and two gave no information. There was a striking difference as regards the frequency of nulliparous women in the series. Nine cases with no pregnancies and ten cases where this information was not obtained—only six cases in our series were nulliparous. We might add that the age incidence of our series compares very favorably with Cullen's series—our youngest patient was nineteen, as was his. He states disease is most prevalent between thirty and sixty years; chiefly near or just past forty is the most frequent time our series shows.

Cullen's case 5768, is quite remarkable. In this case the patient was single and was thirty-eight years of age. The menses at fifteen were regular, profuse and accompanied by clots. She has had a severe dysmenorrhea as long as she can remember, this being more pronounced during the first three days. The uterus amputated at the cervix measures $8 \times 9 \times 8$ cm.; the endometrium is of normal thickness and seems unaltered; the increase in thickness of the uterine wall is due entirely to the diffusely thickened myometrium. No discrete nodules were present. The invasion of mucosa in this case was very marked and was literally falling in the uterine wall through clefts in the myometrium.

This case suggests, first, that myometrial hyperplasia might have occurred before the invasion of the glands. Then the question comes up: what was the cause of the hyperplasia? It seems to us that it is reasonable to assume from the fact of the history of profuse bleeding with this case, that it represents a case of hyperplasia of the endometrium in a young girl which caused this myometrial hyperplasia to develop as a work hypertrophy, the hyperplasia of the endometrium subsequently disappearing. On the other hand, long continued dysmenorrhea may be explained in this case, on mechanical grounds, or to an increased density of the compact portion of the endometrium. In either case there would result a definite increased effort on the part of the uterine wall, which in turn would result in a work hypertrophy.

SUMMARY

Our study of forty-nine cases of diffuse adenomyoma of the uterus brings out a few rather definite points. In the first place it shows that diffuse adenomyoma of the uterus in almost every instance is present coincidently with one or more other lesions. That these lesions are fundamental in influencing the development of this condition is

quite apparent. It is rather difficult to say which one of these exerts a greater influence. It is quite evident that it rarely, if ever, occurs in a normal wall.

The lesion is explained chiefly on mechanical grounds. A parous uterus, or more particularly a uterus which shows the lesion of chronic subinvolution, favors the invasion of the mucosal elements. This invasion immediately causes a reaction on the part of the myometrium due perhaps, either to local irritation or an attempt on the part of the myometrium to withstand this invasion; in some cases this results in a marked hypertrophy of the wall and in other instances this hypertrophy is not particularly striking in this selected group. The explanation that this lesion does not occur in the subinvoluted uterus may rest in the fact that in these cases of subinvolution the endometrium is frequently atrophic and does not have the same tendency to penetrate that a more active endometrium might exercise. The mechanism in cases of hyperplasia alone is explained on an entirely different basis. In this instance the hyperplasia of the endometrium is the primary lesion; subsequently, as a result of the persistent hyperplasia of the endometrium, a work hypertrophy results in the uterine wall which gives it its coarse structure and allows the mucosal elements to penetrate between the widened interstices. In cases of myomata alone the thickened uterine wall exists before the invasion of glands and results from work hypertrophy in an attempt on the part of the uterine wall to rid itself of discrete nodules. That there may be an occasional case in which the explanation of the hypertrophy must be sought elsewhere is shown by the case in Cullen's series, and perhaps our explanation for these may prove satisfactory. As a whole, however, diffuse adenomyoma of the uterus occurs in almost every instance as a result of the presence of some pathological lesion of the uterine wall favoring its development.

That inflammation in the uterine cases is a definite factor in the production of the lesion as in the cases of tubal adenomyoma cannot be substantiated. Cullen has repeatedly remarked the same. In our series it was so inconspicuous that the number of cases was not even tabulated.

CLINICAL CASE HISTORIES

LABORATORY NO. 480.—*Typical case of subinvolution associated with diffuse adenomyoma.* No other lesion in uterine wall. Endometrium 1 mm. thick.

Patient forty-seven years of age, has had eight children, the last two years ago. Since her last pregnancy a partial prolapse of the uterus developed, with more or less constant pelvic discomfort and a marked increase in the menstrual flow. She menstruated every two weeks for the past two years, the flow lasting three to four days at a time. Vaginal hysterectomy was performed.

The uterus was considerably enlarged and measured 12x6x5 cm. There was no evidence of pelvic inflammation. The uterine wall at its thickest portion measured

21 mm.; the endometrium 1 mm., and was normal. There was no general increase in connective tissue but its presence was quite striking in the inner third. Blood vessels of the inner third show in most instances a very marked collection of diffuse elastic tissue around the outer portion of the new vessel wall. The vessels of the middle third, particularly the veins, show an immense amount of this diffuse elastic tissue. The elastic tissue between the muscle bundles and the outer third was also markedly swollen.

This case was reported previously as a typical case of chronic subinvolution which, to be sure, it is. The adenomyoma was discovered subsequently in studying further sections.

CASE NO. 1299.—*Diffuse adenomyoma of the uterus associated with marked hyperplasia of the endometrium in a nulliparous woman.*

Patient was thirty-four years of age. Menses had been three to four days in duration and appeared every 28 days up to about three years ago. Since then the flow has been increased, of long duration, frequently lasting two weeks. The last period has been three weeks in duration and there is still some flow on admission.

Supervaginal uterus is globular in shape and measures 10x10x8 cm. Uterine wall measures 4½ cm. in thickness in the left upper portion. The endometrium in the upper cavity has a shaggy, stringy appearance and is from 1 to 1½ cm. in thickness all over; the tissue hangs in shreds from a base and there are blood clots hanging to the shreds. Microscopically there are numerous glands present in the thickened uterine wall surrounded by a definitely hyperplastic myometrium. Section from the right uterine wall shows a very definite hyperplasia of the endometrium, with only a very slight tendency to invade.

CASE NO. 1323.—*Diffuse adenomyoma associated with a marked hyperplasia of the endometrium in a parous uterus which shows not the slightest evidence of subinvolution.* Specimen presented by Lee Dorsett.

Patient a married woman 48 years of age. One child seventeen years ago. Menses began at twelve and were profuse until twenty, normal to thirty, profuse after thirty, with flooding spells for the last five years. Specimen consists of a symmetrical uterus diffusely thickened throughout, removed by supravaginal amputation. The uterus measures 12x12x10 cm. The uterine wall measures 4.5 cm., in thickness and has a very coarse appearance. No discrete nodules present. Microscopic section shows a very marked hyperplasia of the endometrium, endometrium being 7 mm., thick. The muscle wall is 40 mm. thick. Glands are embedded in the myometrium 1.5 cm., from the base of the endometrium.

CASE NO. 1790.—*A nulliparous uterus with numerous small myomata, hyperplasia of the endometrium, diffuse thickening of the uterine wall and an early adenomyoma.*

Outside case, no history available but patient is single. The uterine wall is studded with numerous interstitial nodules, the largest 5 cm. in diameter. The uterine wall iteslf, outside these nodules, is very coarse and much thickened. The endometrium is thrown into numerous folds and is greatly thickened. Microscopically the endometrium shows definite hyperplasia and definitely invades the myometrium for a distance of 7 mm. Muscle bundles show a very definite tendency to separate.

CASE NO. 1984.—*An early penetration of the endometrium in the wall of a markedly subinvoluted uterus*

The patient forty-four years and has had twelve pregnancies, the last, a full term, three months before admission.

Specimen consists of a large subserous tumor 21x7x8 cm., attached by a small pedicle to the posterior wall, and a supravaginal uterus measuring 7x6x4 cm., which

was entirely distinct from the myomatous mass. The uterine wall measures 18 mm. in thickness; the endometrium is thin but smooth. Microscopically the endometrium shows a very definite tendency to invade the myometrium and by special staining shows very marked evidence of subinvolution throughout the wall.

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(*For discussion, see p. 537.*)

NEOPLASIA OF THE KIDNEY*

With Reports of Five Primary Cases: 1. Papillary Epithelioma, 2. Hypernephroma, 3. Malignant Teratoma, 4. Squamous Celled Carcinoma, 5. Lymphoblastoma.

By James E. Davis, A.M., M.D., Detroit, Mich.

THERE is no part of the body where developmental complexes are better illustrated than in the urogenital system and the nephridial division is more intricate than the genital. Felix[1] says the kidneys do not have a gradual but rather a saltatory development (the word "saltatory" is derived from the Latin "saltator," a leaper or dancer). Others have used the term "nephridial successions" or "dynasties" in referring to this interesting phase in renal development. It is noteworthy that this rapidly moving divisional change has to fit into a definite period of one entire development and as a part of this accomplishment there occurs not only the formation, but also the disappearance of the entire pronephros and the greater part of the mesonephros. The period of development for the excretory system in most vertebrates reckoning from its formation until its completion, occupies an interval, says Felix,[2] that is long in comparison with that shown by other organs. The pronephros begins to appear in embryos of 1-7 mm., when there are but 9 to 10 primitive segments. All its tubules have developed and the primary excretory duct is nearly complete in 2.5 mm. embryos. At 4.25 mm. the duct has reached the cloaca and fused with it, establishing the outlet for the celom.

This first kidney is both[3] vestigial and rudimentary for it is a disappearing structure, but it is also an appearing imperfect organ. While it is true the pronephros functionates in amphioxus and certain lamphreys, it must be regarded as a very limited excretory organ in an imperfect representation of its species.

It is important for the purposes of this contribution to refer at this time to the relation obtaining between the vestigial-rudimentary kidney and its primary or primitive cell units since the pathology may be postulated or the histogenesis determined for neoplasia from just such premises as may here be laid down.

The considerations are of the facts involved in (1) rapid growth, (2) rapid degeneration, (3) growth and degeneration in the same organ at the same time, with constant conformity to a general body growth impulse, (4) cell and organic immaturity held in abeyance to

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larger growth impulse, (5) a three phase evolution from dissimilar component units. The import of the foregoing is made clear by the briefest review of the morphological development of the first of the two primary kidneys. A description of one adequately answers for both primary organs and also covers the essentials of each in the formation of the metanephros.

In the general course of normal development the blastoderm produces its layered divisions of ectoderm, mesoderm and entoderm providing differentiation, proceeds in the orderly way. From the mesoderm of the intermediate cell mass is derived the nephrotome. But in some animals a differentiation of the germ cells occurs before the blastoderm is formed.[4]

From the nephrotomes seven pairs of rudimentary pronephric tubules are formed as dorsal sprouts. These grow dorsally, also laterally, bending so as to unite and form a long collecting duct from the seventh to the fourteenth segments. The first tubules in the seventh segment degenerate before those of the fourteenth have developed.

The free end of the collecting duct extends in a caudad direction beneath the ectoderm and lateral to the nephrogenic cord until it reaches and perforates the lateral wall of the cloaca.

The higher number of nephridial structures occur only in the amniotes. All three are closely related in development and structure whether they are parts of an original continuous organ[5] (holonephros) extended the length of the body cavity and which has broken into separate parts or are they three separate organs or, are they not strictly homologous but superimposed structures has not yet been decided.

The plan of repeating one part after another (metamerism) is said to have its origin in the mesothelial structures and has been secondarily impressed on other systems. The mesothelial walls dispose their parts in three zones of each coelom—the muscle plate zone (epimere), the lower or lateral-plate zone (hypomere), and between the foregoing plates a middle plate zone (mesomere). All three plates form in the trunk. Constriction or segmentation forms the series of hollow cubes (myotomes) each with a part of the coelom (the myocele) within.

The myotome grows between the ectoderm and the somatic wall of the hypomere. Each myotome has a somatic and a splanchnic wall. From the latter or splanchnic wall there is derived the musculature (from the upper part) and the skeletal tissue (ventral part).

The mesomeral (middle plate) part is largely concerned in the formation of the excretory (nephridial) system and it has both excretory portions and the skeletogenous parts (these are called nephrotomes and sclerotomes, the nephrotome cavities being the nephrocoeles).

The foregoing brief discussion may set forth with some degree of clearness the more important essentials to be considered in relating the vagaries of kidney neoplasia with the histogenetic conditions of its development. The latter has yet many unknown problems for elucidation and this is equally true concerning the neoplastic changes developed in the kidney.

The benign tumors of the kidney are usually small, unimportant, and rare, but neoplastic growths constitute approximately 2 per cent of all malignancies. The difficulties connected with their diagnosis, removal, size and vascularity are well understood. The gross appearance in neoplastic tumors of the kidney is fairly characteristic. In the majority of specimens the tissue consistency is soft, resembling degenerating brain structures. Areas of hemorrhage are very constant and blood cysts may occur.

The tumors vary in size according to their age, but ordinarily when discovered they are large and occupy almost the entire kidney area. Some portion of the kidney outline is usually recognizable. Examination of a cross section will frequently show the kidney tissue compressed between the new growth and the capsule. This is most commonly observed in papillary and sarcomatous growths. It is also seen with the very rapidly growing tumors.

Five reports of primary kidney tumors illustrating striking contrasts in histopathologic changes are herewith presented in detail.

CASE 1.—*Papillary Epithelioma.* This type of tumor in the kidney is rare. Knack[6] reported one case in 1918 of a man of seventy-three years of age in whom the growth was found at autopsy and had developed from the ureter. He discussed the scarcity of such cases and found but nine reported in the German literature up to that time.

Hirsch[7] reported one case of papillary carcinoma of the kidney with metastasis in the brain which was found at autopsy in a patient 58½ years of age. The tumor was soft, cellular and with scant stroma. There was a radial arrangement of the cells about thin-walled blood vessels. Capillaries were clearly defined, forming rosette-like structures in the villi. Numerous necrotic and hemorrhagic areas were found. Hirsh quotes Wohl as having collected 12 cases of this type and Kretschner and Moody 11 cases.

McCown[8] reported one case of papillomatous epithelioma of the kidney pelvis, and stated he was able to find but 10 cases in American literature and 38 cases from foreign sources, making 48 in all. Kelly, Babcock, Watson and Cunningham, Lower, Hyman and Beer, Burford, Parmeter, Mayo and Judd are listed as reporters in American literature.

Braasch[9] has reported that 5 cases were seen in the Mayo Clinic up to Oct. 30, 1920.

Patient, a married woman; aged fifty-one years; mother of five children, who had no history of abortions or miscarriages. *Chief complaints,* frequent urination, pain in the left hypogastric region, and bloody urine. *Present illness* began 7 months ago. A painful area together with a mass the size of a hen's egg developed in the posterior portion of the left side. This apparently did not increase in size. A backache with some burning sensation occurred when urinating. At times blood clots passed in the urine. The patient believed she had passed bloody urine for five years. Nocturia and albuminuria were absent. *Clinical data:* Operation was done in October, 1920, by Dr. C. T. Root seven months after the tumor mass was recognized by the patient. Aug. 28, 1921, Dr. Root reported the patient able to do her own housework and that she was without pain or distress and had gained 25 pounds in weight.

Gross description of the tumor mass: The specimen exhibited an irregular form of a kidney with a partly obliterated marginal line in the pelvic portion. Projecting from the slight concavity of the kidney margin there was seen the pelvic portion and its ureter. This resembled the formation usually seen in hydronephrosis,

Fig. 1.—Malignant papilloma of the kidney, case 1. Cross section of the kidney and tumor mass made 3/4" from the pelvis.

the ureter being dilated to a diameter of 2 cm. This dilation of the pelvis and uppermost part of the ureter was caused by the new growth. The poles of the kidney were quite definitely outlined and projected independently of the tumor mass for a distance of 3 cm.

The new growth had enlarged ventrally and laterally. Complete encapsulation was evident. The surface was roughly nodulated. This was caused in part by the projecting poles of the kidney and in part by irregular bulging incident to the enclosed new growth and hemorrhagic changes, for on cross section just beneath the capsule there were seen areas of hemorrhage and areas of vigorous new growth, causing definite thinning out of the capsule.

On section ventrally from pole to pole at a distance of 1 cm. from the midpoint of the pelvic margin of the kidney, the capsule of the new growth was found at the center on the medial side to be 1 cm. and in the poles 3-4 cm. thick. (Fig. 1.)

The margin of the new growth was sharply defined but in the upper pole there was a separate papillary projection at a distance of 5 mm. external to the margin of the tumor. This occupied the position of an obliterated calyx. Multiple vertical

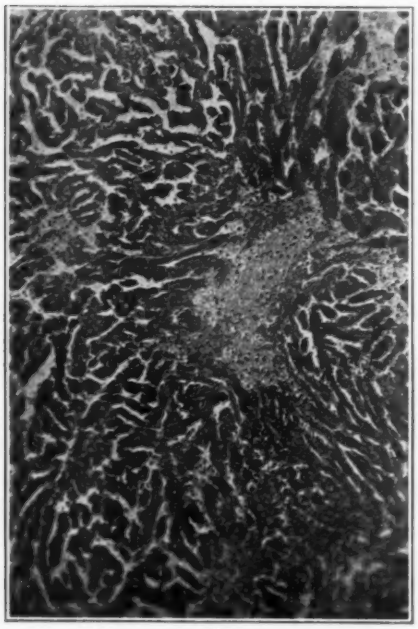

Fig. 2.—(Case 1.) Low magnification showing the papillomatous structure and arboreal arrangement. X-110. Note the areas of hemorrhage and degeneration.

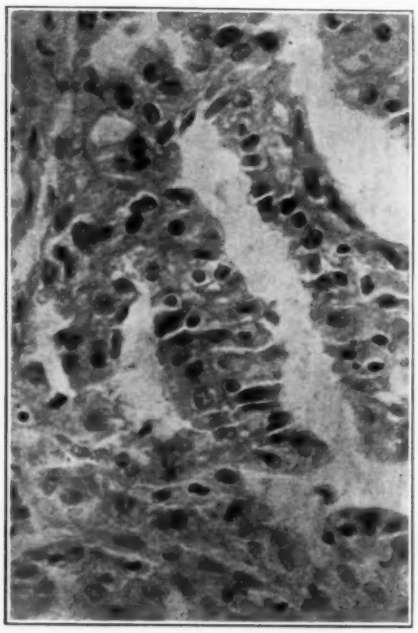

Fig. 3.—(Case 1.) High magnification showing the papillomatous projections. Note the marked anaplasia of epithelial cells irregularly arranged on papillary forms.

Fig. 4.—Adrenal rest tissue in the kidney capsule from a patient age 69 years.

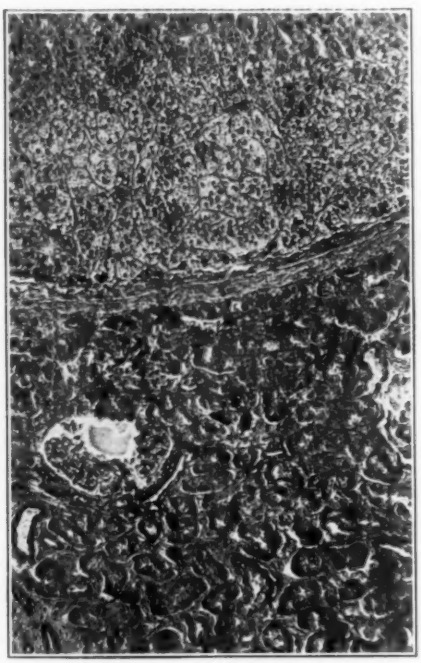

Fig. 5.—Contrast between kidney cortex and adrenal rest tissue. Magnification X-430.

sectioning revealed a varying thickness of capsule down to 1 mm. upon the lateral surface.

The central portion throughout exhibited numerous recent and old hemorrhages. A tracery of fine light-colored seams could be followed throughout the growth. The older portions of the growth were centripetal and the new portions centrifugal.

The entire new growth portion was of light color except where changed by hemorrhage and necrosis. When torn apart the surfaces presented a minute polypoarboreal appearance. The fatty capsule was thick and its fat lobules firm and resistant.

Histopathology: The sections taken from parts of the kidney not involved in the new growth change showed compacted tissue with consequently deformed tubular and glomerular units. The poles of the kidney which had the greatest depth of uninvolved structure showed dilated tubules suggesting hydronephros and mild hydropic cellular change. An extensive, fairly well focalized lymphocytic cell infiltration was observed in the pelvic and corticular kidney tissues. Many scarred glomeruli, some interstitial connective tissue increase and considerable pressure atrophy was present. (Figs. 1-5.)

The new growth tissue was predominantly cellular with a delicate stromal supporting structure giving a papillary plical or arboreal assembling. The widest and most distinctive portions of these stromal supports were outgrowths from the epithelial layer of cells in the kidney pelvis. At the interpapillary positions on the epithelial border there were many intact cells. Each papillary form had multiple laterally projecting irregularly shaped arboreal forms of different lengths, which were richly fruited with epithelial cells, not very remotely differentiated from the same type of cells upon the normal epithelial surface of the pelvis.

The growth of the papillary forms was quite uniformly outward in a fungus-like form from pelvis to the outer convexity of the cortex. A marked compactness of the structure was observed in the entire upper portion of the growth. The epithelial cells in the upper portions had not the same systematic positional arrangement observed in the pelvis and there was marked disassociation of their nuclei. Anaplastic changes were not marked.

The capillaries of the tumor were clearly defined at different places and endothelial cells were frequently observed widely detached from vascular structures. The growth was not markedly vascular. There were numerous areas of moderate hemorrhage and some small places of necrosis. Localized areas of small round cell infiltration were frequently observed within the tumor mass.

Diagnosis: Papillary epithelioma of the kidney. A primary growth from the epithelium of the pelvis.

CASE 2.—*Hypernephroma with Metastasis to the Liver, Lung and Spleen.* This type of neoplasm is by far the most frequent of kidney tumors. A clear distinction should be made whether the tumor originated in adrenal or kidney structure. If from the kidney, sex changes never arise. This has been clearly pointed out by Glynn[10] and emphasized by Bowlby and Andrews.[11]

These tumors are of a sulphur yellow color and remarkably soft in consistency. They can become very large and sometimes are sharply outlined or they may be diffused through the renal substance and by rapid growth attain a malignant character. Their cells are large, many-sided and richly filled with fat.[12]

Patient, Mrs. J. S., aged fifty-six, mother of nine children, seven of whom were living and well. Last illness was indefinite in relation to kidney tumor. Ill health began about one year before her death, being initiated with a severe cold which was followed by a bronchial infection and gastrointestinal disturbances, constipation and loss of weight. General weakness was her constant complaint. *Clinical data:* A palpable tumor 4 by 4 inches in size was observed in the right upper abdominal quadrant. The liver was enlarged and hard, but was movable. The hemoglobin was 65 per cent. Slight hyperexia prevailed and there was cachexia. There were no kidney symptoms discovered and there was no record of blood in the urine. Death occurred 13 months after the onset of her ill health. Gross examination of tissues at autopsy included kidneys, liver, lung, spleen and detached tumor mass. The right kidney was 12 cm. in length, 7 cm. in width and 3½ cm. in thickness. The left kidney was 19 cm. long, 12 cm. broad and 7½ cm. thick. Its cortex varied

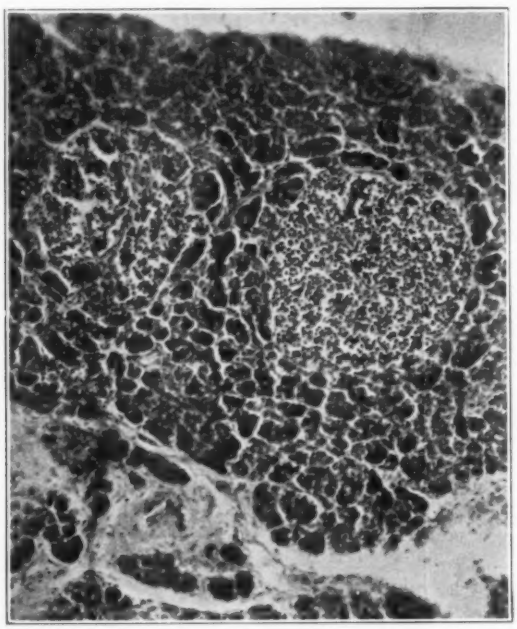

Fig. 6.—Hypernephroma, case 2. Section of pancreas adherent to the tumor mass; note the hypertrophy of the islet structures and areas of fibrosis showing proliferation of islet tissue.

in thickness from 2 mm. to 10 mm. In the area of the lower pole there was approximately 5 cm. of kidney structure with well-defined hypertrophic pyramids. A sharp line of demarcation separated this part from a new growth mass of a soft, yellowish, fatty character in which were band formations. In places necrotic, cystic and hemorrhagic changes were observed. The right kidney was hypertrophic. The liver tissue was hard and contracted excepting an area of new growth change comparable to the mass in the kidney. In the lung and splenic tissues localized changes were observed.

Microscopic examination: A partially encapsuled new growth structure of epithelial character was found with large, irregular, usually polyhedral, light-staining cells attached loosely to a delicate endothelial and connective tissue stroma suggesting the architecture of the adrenal, zona fascicularis. The cell nuclei were usually single, but often multiple. When single their position was usually at or

near the center of the cell and when multiple they were eccentrically placed. The nucleoli were prominent and the nuclear substance was granulated and stained deeply with hematoxylin. A marked prevalence of cell vacuolization was observed, especially in the older portions of the growth, leaving almost a naked capillary framework. In many places old and recent hemorrhages were observed. Tubule forms were not observed in the new-formed tissue. In one section a part of the pancreas was attached to well-preserved actively growing tumor tissue. The pancreatic islet tissue was actively proliferating and its connective tissue was increased. The sections from the liver, lung and spleen showed metastasis of tumor tissue identical with that of the kidney. (Figs. 6-8.)

Diagnosis: Hypernephroma of the left kidney with metastasis to the liver, lung and spleen.

Fig. 7.—(Case 2.) High magnification of new growth tissue. X-430. Note the connective tissue reticulum giving an areolar arrangement of the new growth cells. The vacuolation of the anaplastic cells is best seen in the upper part of the field.

Fig. 8.—(Case 2.) Contrasting pancreas and contiguous hypernephroma structure. Note the anaplasia of new growth cells with giant cell formation to the left.

CASE 3.—*Malignant teratoma.* The derivation of this type of tumor is difficult to trace because of differentiation and developmental unknowns. It is most satisfactory to recall that myotome may give striped muscle fibers, scleratome may yield cartilage, mesenchyme may produce connective tissue including smooth muscle and possibly vessels and the intermediate cell mass the glandular or epithelial formations. It is also to be considered that the intermediary cell mass middleplate in the myotome and in the mesenchyme may yield mixed tumors.[13] Junkel[14] says these cells of undifferentiated tissue have

failed to take part in the ulterior cellular differentiation and for some unknown reason begin to grow and differentiate themselves in the grown-up organism. . It is useless to attempt a summary of the literature of this type of tumors, there being but few cases reported in detail and all differ in interpretation of essentials.

Patient, Miss E. G., aged sixty years. *History:* About six months before her demise there was general malaise, loss of weight and appetite. Three months later occasional pain of a dull, aching character was felt in the left lower quadrant and back. This gradually increased in frequency and severity until it was almost unbearable. A mass just above the iliac crest appeared with the onset of pain and increased to a large tumor which was palpable over the entire side. Palpation or pressure over the area was painful. Micturition was frequent and painful.

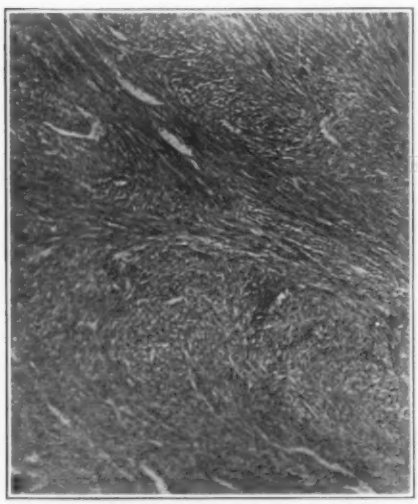

Fig. 9.—Malignant teratoma of the kidney, case 3. Connective tissue portion of the tumor. Low magnification X-110. Note the fascicles and interlacing fibers of connective tissue and muscle cells, the marked cellularity of tne structure, and the vascular spaces.

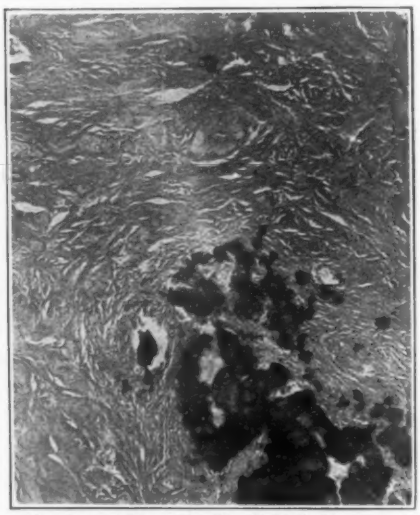

Fig. 10.—(Case 3.) Hyalinized fibrous portion of the tumor. Low magnification X-110. Note the vascular spaces, the dense acellular type of architecture, and the deposits of calcium salts in the lower right corner.

Clinical data: Repeated urinalyses were negative. Kidney efficiency tests were negative until later when the output from the left was 12 per cent in 15 minutes. Catheterization and roentgenogram showed the left ureter displaced medially and the presence of an irregular homogenous mass. The total white cell count was 17650 and the polymorphonuclear cells were 80 per cent. Operation by Dr. Ray Andries revealed a retroperitoneal tumor mass involving the lower pole of the left kidney and extending medially across the spinal column to the right side and adhering to the surrounding tissues. The postoperative shock was severe. Death occurred 27 days following her operation. Autopsy was not obtained.

Gross description: The specimen was an irregular hunter's horn shaped mass of tissue with a well-defined upper pole, preserving a fairly normal kidney outline. The dimensions of the mass were 15 cm. long by 9 cm. wide across the lower pole, and 6 cm. thick. A portion of the mass at the lower pole, including the capsule was torn away. When vertically sectioned the tumor mass was shown to be 8 x 8 x 6 cm. in size. A well-defined encapsulation was seen along part of the upper sur-

face. The substance of the new growth mass was partially soft, and light-colored, the structure was partially fibrous and cartilaginous in character. Evident extension through the capsule had occurred at the lower pole and outer lower convexity.

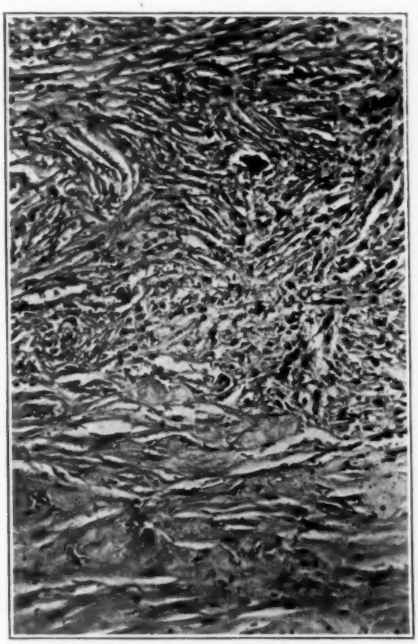

Fig. 11.—(Case 3.) Fibrous tissue portion of the new growth. Low magnification X-110. Note the irregular diffuse arrangement of new growth tumor cells and the atrophy and anaplasia of cells.

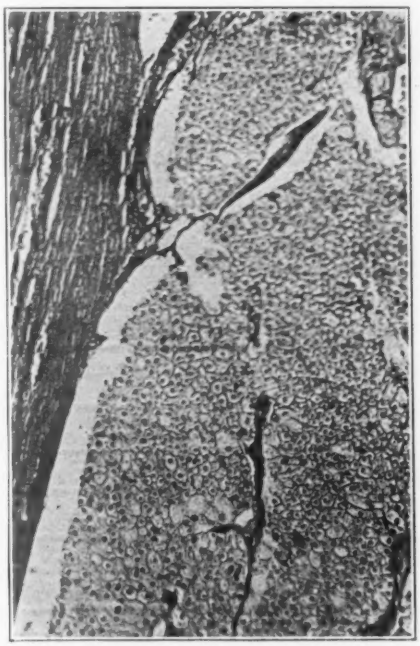

Fig. 12.—(Case 3.) Area of anaplastic epithelial new growth cells. Low magnification X-110. Note the solid mass of large epithelial cells showing abundant cytoplasm and round or oval nuclei.

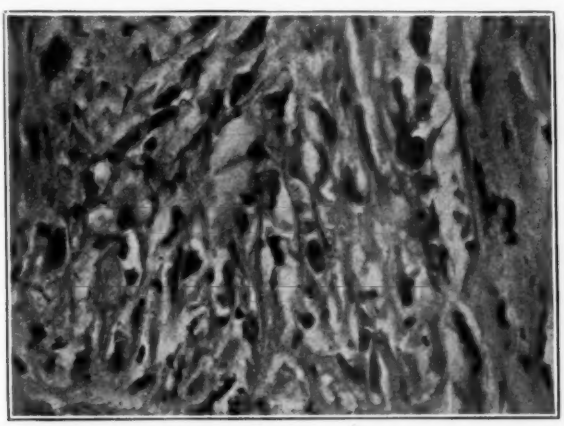

Fig. 13.—(Case 3.) Fibrous portion of the tumor. Note the hyalinized tissue in the upper part of the field, the thin-walled blood spaces at the line of demarcation, and the anaplasia of new growth connective tissue cells.

At the upper border of the tumor mass what appeared as capsule was identified as distended displaced pelvic wall. The ureter was not seen.

Microscopical examination: The kidney tissue not involved by the new growth exhibited early albuminous degenerative changes with irregular tubular dilatation

and some blood casts, also slight local interstitial tissue increase, a few scarred glomeruli and small round cell infiltration, particularly in the pelvic tissues. In sections from the hilum of the kidney there was a partially walled-off tumor mass which in places flattened out the calyces and compressed the contiguous kidney structure. The structural units of connective tissue, muscle and epithelium were clearly definable. In parts where fibrosis, hyalinization and calcification were prominent, cartilage was in question. There were places where atypical tubules were recognized. In the more acellular tissues very prominent lacunar spacings were found. The parts of the tumor constructed from connective tissue and muscle elements had a prominent fasciculated and interlacing architecture. The cells in the connective tissue structure were distinctly more anaplastic than in either the muscle or epithelial tissues, but the two later types were better differentiated. The connective tissue cell nuclei were very irregular in size and shape and many were multinucleated. The muscle cells were fairly uniform. The epithelial areas of the tumor had rather small and almost uniform sized cells, many of which were vacuolated. The stroma was very scanty and vascularity was not marked. A fatty degeneration was observed in certain areas. (Figs. 9-13.)

Diagnosis: Malignant teratoma of the left kidney.

CASE 4.—*Squamous and spheroidal celled carcinoma of the kidney.* Primary carcinoma is rare in the kidney. Ewing[15] speaks of these tumors as remarkable and of large size and of their relation to leukoplakia and calculi. Bowlbey and Andrews[16] mention carcinoma of the kidney, though rarer than sarcoma, as not uncommon in adults and that it may originate in the pelvis and be of the squamous type. More frequently it originates in the cortex and is spheroidal or columnar-celled.

Patient, Mrs. M. LaT., aged sixty-two, mother of 3 children. *Last illness:* Duration approximately 4 months. The onset of symptoms was characterized by aching in the left hip and, when severe, radiation down the leg. In 6 months there was a loss of 35 pounds in weight, but no urinary disturbances occurred.

Clinical data: A large, hard nodular mass was palpable in the left lumbar region. The urine examination was negative and the blood picture indicated a moderate secondary anemia. At operation the left kidney was removed by Dr. Geo. E. Potter. It was found to be 8 inches long, 4 inches wide and 5 inches thick and showed that extensive degenerative changes had occurred throughout the entire organ. The patient died in 23 days after her operation.

Gross examination: The specimen was not intact and fragmentation of the tumor in its pelvic portion was evident. The thickness of encapsulation by the compressed displaced renal tissue varied from 2 cm. to 2 mm. The tumor areas were of whitish color and of fairly firm consistency and occurred as multiple areas when viewed from the cut flat surfaces. Extensive involvement was evident and the pelvis showed the older growth of tissue.

Microscopic Pathology: In sections from the pelvis of the kidney the new growth tissue was composed of compact squamous and spheroidal, closely arranged cells with but little or no intercellular substance. The formation was an irregular stratified layer replacing the pelvic epithelium while the tissue from the cortex exhibited marked compactness of structure with a rich deposition of intercellular substance. The blood vessels of this part were few in number and small, but in the pelvis they were numerous, thin-walled and dilated. There was no positive alveolar arrangement of new growth structure, but infiltration of tumor cells in columns replaced the renal structure. In the greater part of the entire new growth coalescing of the cell groups prevailed and the involvement extended quite generally to

all parts of the kidney. The tumor cells showed a most pronounced anaplasia and unusual cell division changes. The cell nuclei were exceedingly irregular in shape and number. Epithelial pearl formation was not prominent. The kidney structure was rapidly and diffusely undergoing tumor cell metaplasia. In the pelvis and medulla chronic infection and hemorrhage were marked. In the cortex compression changes were prominent and many scarred glomeruli were found, but no evidence of calculi was observed. (Figs. 14 and 15.)

Diagnosis: Rapidly growing squamous and spheroidal celled carcinoma, originating in the kidney pelvis.

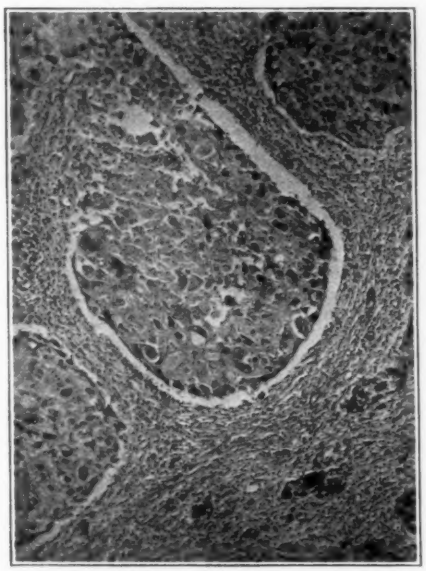

Fig. 14.—Primary carcinoma of the kidney, case 4. Low magnification of kidney tissue showing the invading epithelial new growth. (X-110.) Note the few isolated kidney tubules in the lower right corner and the solid masses of flat new growth epithelial cells.

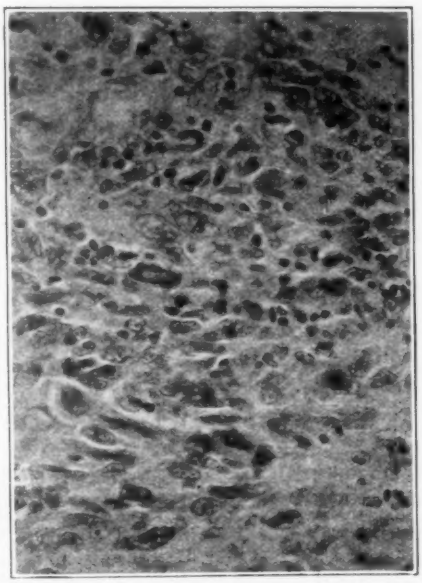

Fig. 15.—(Case 4.) High magnification of new growth cells. X-430. Note the marked anaplasia of cells.

CASE 5.—*Lymphoblastoma.* The literature upon this type of kidney tumor illustrates an unsettled classification and careless nomenclature. (Longhuame.[17]) The occurrence of this type of tumor in children under 5 years is relatively frequent. Its size is sometimes very large, reaching ½ the weight of the child. In renal tumors of infancy the round and spindle cells are nearly always found.

Patient, Philip S., aged seven months. The tumor was unnoticed until a few days before death. During the last five days the abdomen had become greatly distended and the patient appeared exsanguinated. A tumor mass extending from the costal margin to the lower border of the pelvis and three finger-breadths to the left of the median line was easily recognized.

Clinical data: Abdominal exploration was done by Dr. Jas. A. MacMillan, but removal of the tumor was deemed impossible. Severe hemorrhage followed the removal of some tissue from the tumor mass. Death occurred a few hours later.

Autopsy Examination: Revealed a tumor mass filling the entire right half of

the abdomen, extending from the dome of the diaphragm to the inner aspect of the ileum and extending transversely 6 cm. to the left of the umbilicus. The ascending colon crossed the tumor mass obliquely, ascending from the right outer margin

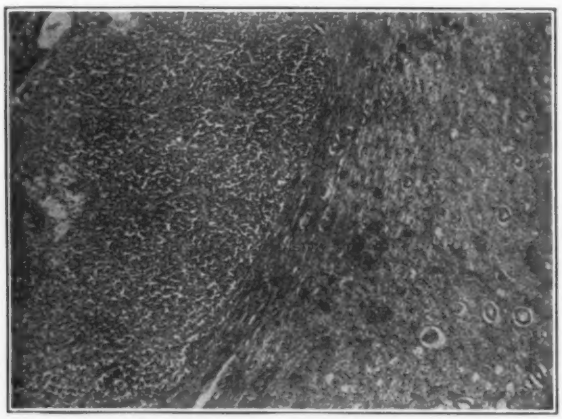

Fig. 16.—(Case 5.) Malignant embryomata of the kidney from a child 7 months old. Low magnification showing the line of demarcation between new growth and kidney tissue. (X-110.) Note the pressure changes in the kidney tissue in the upper part of the field.

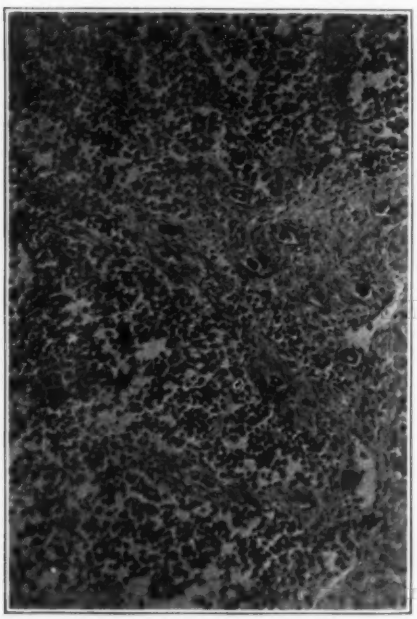

Fig. 17.—(Case 5.) Section of new growth tissue with kidney tubules at the right. Low magnification X-170. Note the marked pressure atrophy of the kidney tubular structure, the irregular line of demarcation between kidney and new growth.

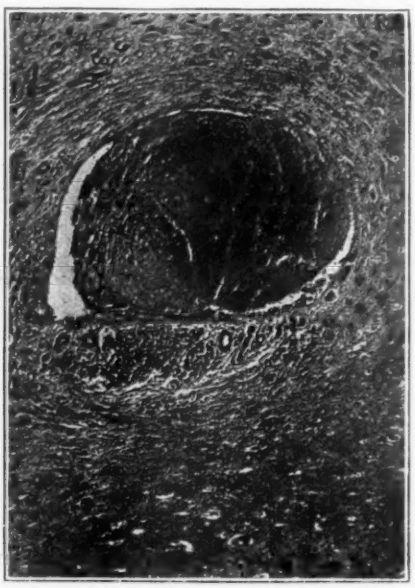

Fig. 18.—(Case 5.) Section of kidney showing thrombosis of a blood vessel. Low magnification X-110. Note the focal aggregations of tumor cells below the blood vessel.

of the lower pole across the mass to the median line, carrying the hepatic flexure toward the median line. The capsular surface of the tumor was thickened, distended and nodulated. The ureter was free and the adrenal was uninvolved. Two

Fig. 19.—(Case 5.) New growth metastasis in a contiguous lymph node X-430. Note the marked anaplasia of cells. The larger cells in the lower half of the field are the anaplastic cells.

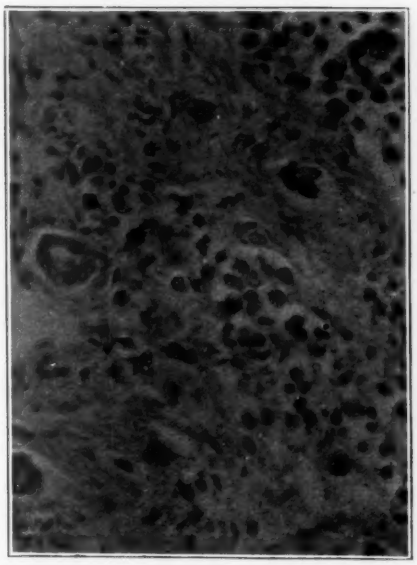

Fig. 20.—(Case 5.) Line of demarcation between kidney tissue and the new growth cells on the right. X-430. Note the degenerative changes in the kidney tubules, the interstitial tissue increase, and the extension growth of anaplastic cells in the center and right portion of the field.

Fig. 21.—(Case 5.) Section of thymus gland showing premature ageing. Note the hypertrophic Hassel's corpuscles and fibrous tissue increase in the septae.

Fig. 22.—(Case 5.) Section of liver showing marked fatty degeneration.

lymph glands were involved, but with this exception the new growth appeared entirely intrarenal.

The tumor mass was firm and appeared indistinctly lobulated. Considerable hemorrhage had occurred within and without the tumor. The left kidney showed slight hypertrophy and moderate cloudy swelling. The liver was very pale and yellow, suggesting hemorrhage and fatty degeneration. The right adrenal was firmer and somewhat smaller than normal.

Histopathology: The sections from the ovary, thymus, thyroid and adrenal tissues showed advanced ageing of these structures. The liver was uniformly undergoing fatty degeneration. The tissue of both kidneys was markedly advanced in development. The characteristic narrow cortex crowded with small glomeruli was changed to correspond with a development of eight or ten years. The renal interstitial tissue was irregularly increased.

The new growth was extensively infiltrated through the greater part of the right kidney by cells indefinitely comparable to lymph cells, but the majority of the tumor cells were, however, more than double their size as shown in the photomicrograph of the invaded lymph gland. A considerable number of these cells were morphologically like very young connective tissue forms. All of the neoplastic cells were hyperchromatic and anaplastic. A fine stroma of capillaries prevailed in all parts of the new growth. Cell division forms were numerous and giant cells were seen. Multiple hemorrhage occurred throughout the mass and many thin-walled dilated vessels were evident. (Figs. 16-22.)

Diagnosis: Lymphoblastoma of marked malignancy in the right kidney and mesenteric lymph gland metastasis.

SUMMARY

1. The developmental history of the renal tissues is yet incomplete and at many points theoretical. 2. The histogenesis for tumor tissue of the kidney is intricately involved by existing obscurities in both ontogenetic and phylogenetic development. 3. The frequency of renal neoplasia occurrence is again emphasized as selective of young and old age periods of life. 4. The diagnostic symptomatology is frequently exceedingly indefinite. 5. Clinical and pathological investigation of renal tumors should be carefully made and reported in the literature. 6. The five cases are here reported as primary renal tumors. All have been carefully studied to exclude metastatic origin.

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111 JOSEPHINE AVENUE.

(*For discussion, see p. 501.*)

TRANSPERITONEAL NEPHROPEXY*

By Thomas B. Noble, M.D., Indianapolis, Ind.

THE normal position and relationship of the abdominal viscera depend, primarily, upon the integrity of the abdominal wall. Of secondary importance is to be considered their ligamentous attachments and their variations in specific gravity. All the abdominal viscera float more or less freely within a cavity having a fixed and rigid back and base, with a highly elastic cap, sides, and front.

Through their ligamentous attachments must, naturally, come their blood and nerve supply. The solid viscera are rather firmly attached by short supports in fixed localities, while the hollow viscera with much longer supports have a more indefinite topography or position. It is obvious then that anything which tends to disturb the normal position of any one of the abdominal organs will have a distorting influence on all the others. And as a physical proposition those organs of shortest attachments will be, naturally, the first to have nerve irritation and to present symptoms. It is a logical sequence then that, among the first viscera to cry out against the disturbing features of visceroptosis, is the kidney. The right one is most frequently involved. This occurs more often in women than in men. Men rarely have it.

We have in common use the terms, movable or palpable; motile or hypermotile; floating or wandering kidneys; all of which refer to the degree of motility but bear no relationship to symptoms. They serve their purpose in nomenclature, but aid us little in practical therapeutics.

Subjective symptoms are not in accord with the degree of mobility or displacement. Some cases of slight distortion have many symptoms while others of great displacement have none. There is nothing pathognomonic of this condition. Objective signs may be confused with pathologic processes of the gall bladder, stomach, duodenum, colon—including the appendix and teratomata. While subjective symptoms may be associated with most everything. All sorts of secretory, sensory and motor disturbances of the gastrointestinal tract, disturbances of circulation and urinary output, pelvic symptoms, headache, vertigo, general exhaustion with dragging pains in the loins are a few of the many symptoms associated with this disease. And while they may be properly associated with this disease, many of them may be just as properly associated with other pathologic conditions in and near to this region.

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No operative treatment, therefore, should be undertaken without a most careful and painstaking investigation, and should be made with an incision which gives the widest field for observation and pathologic differentiation. Such an incision is logically in front and not in the back. As a result of unsatisfactory experiences with the lumbar incision I abandoned it fifteen years ago, and during these years have confined myself wholly to a method which may be described as follows:

Open the abdomen by an incision a fingerbreadth below the costal border, extending from the median line to near the tip of last rib. Elevate the liver and gall bladder by means of a broad retractor in the hands of the first assistant, while the second assistant with a gauze pad introduced into the abdomen holds downward and inward the hepatic flexor of the colon. Proper traction by the two assistants makes taut the peritoneal reflection lying in front of the kidney and brings it well into view. The peritoneum overlying the kidney is now incised for the distance of about four inches. Through this incision the hand is introduced around the fatty capsule and after free dissection, the kidney and its capsule are lifted outside of the abdominal wound. Looking into the bed from which it has been removed, there will be seen some loose areolar tissue lying upon the reflection of the diaphragm, the transverse fascia and the quadratus lumborum muscle. With a pledget of gauze in the jaws of forceps, this should be wiped well away from these structures, so that the fascia is perfectly clean. If this be carefully done no hemorrhage or oozing will occur and the pocket which the kidney is to occupy will be dry.

Turning now to the kidney itself which lies outside of the abdominal wound, the fatty capsule is completely removed from its posterior aspect, exposing the fibrous capsule underneath. Hemorrhage may occur from a few small vessels which should be carefully ligated.

Next, incise the fibrous capsule from the upper to the lower pole carrying the incision close to the hilum. Separate now, the fibrous capsule from the kidney substance, denuding the entire posterior aspect of the kidney of its fibrous capsule so making a fibrous flap everywhere free except at its base, where it still remains attached to the major curvature or convex surface of the kidney. Care should be exercised in removing the fibrous capsule lest wounding of the kidney substance and troublesome oozing occur.

A suture of No. 2 chromic catgut 20 inches in length is now carried through the upper end of the flap of fibrous capsule which still remains outside of the abdomen and is next caught in the fascia transversalis or quadratus lumborum high up in the bed from which the kidney has been removed.

A second suture of the same character is likewise introduced through the lower end of the fibrous capsule and carried down and made to

catch up a second portion of the fascia or the quadratus muscle in the lower aspect of the cavity. A third suture is again introduced through the same structures but midway between the two former sutures. Clamps are attached to either end of these sutures as they are introduced.

The kidney is now restored to its normal position by being dropped back into the abdomen through the incision in the posterior peritoneal reflection. Clamps are removed from the ends of the sutures and they are securely tied. Thus the kidney is suspended with its denuded posterior aspect lying against the quadratus lumborum muscle to which it has been attached by three sutures through a flap of its fibrous capsule. Under the eye of the operator it has been restored to its normal position with no distortion of its blood and nerve supply and with a free ureteral drainage.

A running suture of plain catgut next closes the wound in the peritoneum overlying the kidney. The edges of this wound should be turned in so as to prevent the formation of adhesions. The abdominal wound may be closed in the usual manner.

I have been fixing the kidney by this method for fifteen years. I have had no case return to me with failure. In two cases infection necessitated drainage for a time. Two cases were relieved who had been operated by the lumbar route with low fixation and increase of symptoms.

I feel warranted in recommending this operation: 1. Because it establishes regional and general abdominal diagnosis. 2. Because through its primary incision much other work can be done on other abdominal viscera, if necessary. 3. Because it permits the operator to place the kidney where it belongs. 4. Because the lapse of time since its inauguration has been sufficient to prove its value.

1008 HUME-MANSUR BUILDING. (*For discussion see p. 531.*)

TRANSUTERINE INSUFFLATION, A DIAGNOSTIC AID IN STERILITY*

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IN a previous paper, I stated that the subject of sterility was not only important from a medical standpoint but also from a social aspect. I am now more than ever convinced that early environment and mode of living, especially in metropolitan districts, must be taken into consideration in our study of the subject. Our social structure, in recent years, has undergone great changes. It is a question whether the so-called "Woman Equality Movement," now permeating the entire civilized world and, of necessity, bringing the adolescent girl into various industrial fields, is not having its deleterious effects; so that a great many girls, who are of an inferior constitutionality, do not develop properly; with the result that the entire cycle connected with menstruation and ovulation is, to a great extent, interfered with.

Every gynecologist who has been in active practice for a score or more years knows that, primary as well as secondary, sterility is constantly on the increase; and that, in the majority of instances, he is unable to relieve or cure the condition. The two years preceding August 1, 1921, I saw in my office 403 patients who consulted me because of their sterility. The male aspect was in every instance investigated either by us or through other laboratories, and I was pleased to find that sterility due to the husband is on the decrease. I believe that the educational campaigns, conducted by the medical profession and various Public Health Agencies, are now just beginning to bear fruit. The average intelligent young man has been, practically, frightened into the practice of continence before marriage and the result is that gonorrhea and all its complications are on the decrease. In previous years, in fully 25 per cent of cases of sterility, the cause could be ascribed to the male; now it is not more than 10 per cent.

In this paper I shall not attempt to discuss the general subject of sterility, or even make a complete study of the material at hand. I shall confine my remarks only to one phase of it and that is fallopian tube patency. And here I wish to state that the present practice followed by the profession at large, and also by some specialists in ascribing stenosis of the cervical os as a cause of sterility, is entirely fallacious in fully 95 per cent of cases and I am certain that not only do operations on the cervix fail to cure the patient, but, in a number

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of instances, cause mild and insidious infections which finally involve the tubes and the patients become permanently sterile. Dilatation and curettage as practiced by the general practitioner; the stem pessary and cutting operations on the cervix, as practiced by the specialist, have cured very few patients. That this contention is true is proved by the fact that over 300 of my patients had cervical operations ranging in number from one to six. One of these patients had her cervix dilated four times by general practitioners, once a stem pessary operation by a specialist; not having been cured by these five operations she again consulted a gynecologist. He performed a Dudley operation on the cervix and she is still sterile. I have always held that, if a woman has a cervical canal sufficiently large to discharge the menstrual blood, the canal is roomy enough for a spermatozoon to pass through. In all but two cases I succeeded in introducing a fairly large cannula into the lumen of the uterus without any discomfort to the patient, proving that cervical stenosis is, usually, a myth and practically does not exist.

I believe that the time is ripe for the teachers in our medical colleges to point out to the future members of the profession the erroneous conception heretofore held regarding the mechanical aspect of sterility and, in that way only will be eliminated useless and obsolete operations which in a great many instances are a cause for permanent sterility. I maintain that in the few instances, where pregnancy followed such procedures, these patients would, eventually, have become pregnant even if they were not operated upon. Operations on the cervical canal without definite knowledge as to the condition of the fallopian tubes are obviously incomplete procedures. Heretofore we had no means by which we could definitely establish the patency of the tubes. All of us have realized that in a great number of patients the involvement was so slight, that no matter how skillful and astute the examiner was, that very often he was unable to detect these pathologic changes, and yet they were sufficient to cause complete closure or obstruction in the tubes.

The recent work of Stein and Stewart in this country, reawakening interest in peritoneal gas inflation, followed by Roentgen examination, has evidently stimulated Rubin of New York to adopt this procedure in order to study the patency of the fallopian tubes. To Rubin must be given the credit of really adding a new diagnostic point which is definite and certain if properly carried out and which is of great aid in our study of sterility. We feel that at present the treatment of sterility is incomplete unless the patient is examined for patency of the tubes. Unfortunately, however, there are a great number of cases whose fallopian tubes are patent and, notwithstanding treatment, remain sterile. These cases must be grouped under the heading of

sterility of constitutional origin which may be temporary or permanent in nature. The menstrual history of the patient must be thoroughly studied as to time of onset, frequency, duration, and quantity of blood lost with each menstrual period. This, with the findings elicited by vaginal examination, will often help to decide whether the sterility is of a permanent or temporary nature.

In recent years to the glands of internal secretion have been ascribed marvelous curative properties in the treatment of sterility and menstrual disorders. The literature abounds with enthusiastic reports of the successful treatment of sterility by various combinations of glandular extracts. In my series of cases, the majority of patients have, from time to time, been treated by some of our most enthusiastic advocates of glandular therapy but still remained sterile. I have also attempted to treat these patients along the same lines and, with but few exceptions, the results were not good. Endocrinological treatment has its place in some of the milder menstrual disorders, but it certainly fails to cure the more severe types of menstrual disorders and is of little avail in the treatment of sterility. I make this statement advisedly; for the 403 women who have consulted me regarding their sterility have, from time to time, consulted many other gynecologists, some of whom practically limited their entire conception of human derangement to some endocrinologic disturbance and who have fed them on various combinations of gland extracts and still the women remained sterile. It seems to me that sterility is not caused by ovarian, thyroid or pituitary disturbance, but by that something which causes that disturbance in these various glands. In other words, glandular disturbance is a terminal condition and is only secondary in nature to some processes in the human economy which alter the normal physiologic functions of these glands. And, it seems to me, that the mysteries associated with functional disturbances will only be solved by a thorough understanding of the biochemical processes of the body.

In December, 1920, after familiarizing myself with the work of Rubin as reported by him and, also, after a personal visit to his clinic by Dr. S. S. Rosenfeld in order to study the technic of this procedure in detail, I instituted this method of examination at the Lebanon Hospital. The patients were carefully selected and were thoroughly examined clinically before they were subjected to this examination. During the past ten months we made one hundred examinations.

TECHNIC

The examination must be carried out under the most rigid aseptic precautions. The patient's clothing is removed and she is dressed in an operating gown. She is placed in the lithotomy position. The vagina and cervix are carefully cleansed and the latter is grasped,

preferably, by a sponge holder. The cannulae employed are of the Keyes-Ultzman type with a perforation at the tip and several along the sides. The caliber of the cannula used will depend on the size of the cervical canal. The introduction of the cannula will often be facilitated by first determining the direction of the uterine canal with a sound. The apparatus consists of a glass blown cylinder enclosing a glass siphonometer. This and its attachments can be obtained from Machlett of New York. Before introducing the cannula into the uterus I make sure that there is no obstruction in the cannula itself. This is usually determined by immersing the cannula in a sterile solution and watching for the gas to bubble through. The cannula is then introduced into the uterine cavity and the gas turned on slowly so that it takes about 15 seconds for the column of mercury to rise from zero to 100 mms. The amount of gas consumed is determined by the reading of the siphonometer which is incorporated in the apparatus. Each "bubble" approximately represents 37 c.c. of gas. Regurgitation of the gas through the cervix is prevented by the use of a rubber urethral tip, which is fitted over the cannula and snugly inserted into the lumen of the external os. The rise of the mercury in the manometer is carefully watched. In this series, the average rise in the "patent" cases was 118 and in the "closed" cases the average rise was 176. If oxygen is used not more than 300 c.c. should be introduced since oxygen is slowly absorbed and, therefore, is likely to produce pressure symptoms in the right upper quadrant of the abdomen causing pain in the right shoulder. When carbon dioxide is used a greater quantity can be introduced because of the rapidity with which it is absorbed. The patient is then fluoroscoped in the erect posture in order to see whether gas is present in the abdominal cavity. Usually the gas is seen in the right upper quadrant under the diaphragm separating it from the liver. A smaller quantity is also visible in the left subphrenic space. With increased experience one is usually able to foretell by the manometer reading, studying the rise and fall of the mercury column, whether the tubes are patent or not. However, in order to establish a positive diagnosis the fluoroscope must be employed. I have had several instances where the mercury rose to comparatively low levels, nevertheless, the fluoroscope failed to reveal the presence of any gas and vice versa, I have had cases where the mercury rose to over 200 mm. with very little fall and yet the fluoroscope showed the presence of gas. I do not allow the pressure to rise above 220 mm. of mercury; however, on two occasions the mercury rose to 250 and 260, respectively, without any complications. In patients in whom the tubes are closed the gas will usually escape through the cervix as soon as overdistention of the uterine cavity has taken place. In doubtful and negative cases, it seems to me, that it

would be a good rule to have the patients re-examined a second and even a third time in order to definitely establish the diagnosis. Two of my patients, in whom the first examination proved negative, were found to have air in the abdominal cavity on the second examination. I believe that it is possible for the gas to either dislodge or pass by the mucogelatinous substances which very often partly clog the tubes, and at times, it will even overcome a kinking of them. This may be the reason why in many of the patients the mercury column rises very high before the initial fall takes place. In my series of cases 58, or 58 per cent, were positive, i.e., air present in the abdominal cavity; 42 cases, or 42 per cent, were negative, i.e., no air present in the abdominal cavity.

CONTRAINDICATIONS

This method of examination must not be used in the presence of acute infections of the vagina or pelvic organs. The danger of spreading infection under such conditions is obvious. It also must not be used in the presence of chronic infections if the patient complains of pain. In these cases it is best to defer examination until the pain has subsided, indicating that any irritation about the pelvis has disappeared. It should not be performed at the time when the menstrual period is about to appear. Patients who have heart disease, especially when myocardial changes are suspected, should not be subjected to this examination because the pressure of the gas by raising the diaphragm may seriously embarrass the heart action.

In this series the only complications we had were: (1) a severe syncope in a patient who was quite obese. Apparently, as soon as the gas lifted the diaphragm, the heart action was interfered with. The patient became cyanosed and the pulse barely perceptible. However, she rapidly rallied and I was able to continue with the fluoroscopic examination; (2) the same, to a lesser degree, happened to another patient; (3) in one case, previously operated upon for acute appendicitis and later for intestinal obstruction, and who had adhesions in the left pelvic region. In this patient I evidently caused sufficient irritation by our manipulations so that the patient developed an acute inflammatory condition in the left fornix which lasted about two weeks and subsided under palliative treatment. Ordinarily patients will complain of pain in the right side of the abdomen and right shoulder which lasts anywhere from twelve to forty-eight hours when oxygen is used; but this pain can be minimized by the use of carbon dioxide.

A close study of this procedure convinces me that this method of examination should be utilized in every case in which the cause of sterility is of doubtful origin. It is important that the patency of the tubes should be established before any form of treatment is undertaken. It is especially useful in patients who have had a unilateral

infection of the fallopian tube or in patients who have had one tube removed. Heretofore we had no means by which we could ascertain the patency of the other tube except by abdominal operation. Our conclusions in such cases were that the other tube was also involved, but the involvement was not sufficiently great so that it could be detected by the examining finger and, therefore, many of these patients were advised to undergo a plastic operation on the tube in order to cure sterility. Patients who are suffering from fibroid tumors of the uterus, and who are sterile, should be examined in order to ascertain whether the continuity of the genital tract is not interrupted and if, on examination, we find the tubes occluded, there should be no hesitancy on the part of the surgeon to advise removal of the tumor, for pregnancy in such patients is almost impossible. It is a very useful procedure in patients who have had myomectomies performed. It will disclose whether the continuity of the genital canal has not been disturbed. This was very well illustrated in one of my cases: Mrs. A. G., twenty-eight years, married 2½ years, never pregnant, was one year ago operated upon by a well-known surgeon for multiple fibroids. She made an uneventful recovery and on vaginal examination the uterus and adnexa were apparently normal. She menstruated regularly and clinically there was no reason for her sterility. However, in attempting to "insufflate" this patient, we found complete obstruction to the passage of gas.

Patients who have had plastic operations on the tubes for the cure of sterility should be examined in order to determine whether the tubes remained patent. This procedure will, eventually, help us to make a proper evaluation of all plastic operations on the fallopian tubes for the cure of sterility; because it will make it possible to definitely tell in what percentage of patients we succeeded in overcoming the obstruction in the tubes. Until now plastic operations on the tubes for the cure of sterility resulted unfavorably in my hands as far as the correction of the obstruction was concerned. That this is so, I became more convinced since examining a number of patients who were operated upon by us as well as by others and when I tried to "insufflate" these patients I found their tubes closed.

The therapeutic value of this method of examination must, for the present, be left in abeyance. However, three of my patients became pregnant after they were insufflated. One is now in the seventh month of her pregnancy, the other in the fifth month and the third is pregnant six weeks. It is possible that the entrance of gas into the tubes under pressure will expel mucus plugs from them and also straighten out kinking which might have taken place along their course.

In conclusion I wish to state that this procedure has been used in a sufficiently large number of cases by three or more investigators to

warrant its universal adoption as a routine method in the diagnosis of and treatment of sterility. I hesitated to institute this examination fearing that untoward complications might take place and in that way, not only endanger the lives of my patients, but also expose myself to legal complications. In my hands this procedure has been found to be safe and I utilize it in every patient in whom I think it is indicated.

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END RESULTS IN OBSTETRICS*

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THAT the end results from obstetric practice are not all that could be desired, is a generally accepted fact among all who have investigated this subject.

According to the records of the provisional birth registration area of the United States, one mother dies for each 154 babies born. The United States is the fourteenth in mortality statistics for puerperal sepsis, only two, Switzerland and Spain, showing higher rates per hundred thousand. Sweden is best, with one maternal death to 430 labors. Seventeen thousand eight hundred is the estimate of maternal deaths in the United States in 1919. This is probably somewhat too high, but the fact remains that the number is very large. While these figures seem large for the maternal deaths, the infant mortality is much larger. As to the morbidity figures following labor, we have little accurate information. Brothers found stillbirths in New York City in as high as 8 per cent of all labors. Various European clinics show 4 to 7 per cent. Williams' figures show 705 fetal deaths in 10,000 labors, 283 probably due to labor. These are classified as follows: dystocia, 124; placenta praevia, 22; ablatio placenta, 13; toxemia, 46; prematurity, 6; unknown, 74.

The following statistics for Norfolk for 1920 have been furnished me by Dr. P. S. Schenck, Director of Public Welfare: Labors, 3,104; white 2,013, colored 1,091, stillbirths 337, white 164 and colored 173. These figures show that including colored, the percentage here is about 10 per cent stillbirths. It is my belief that this is also somewhat large because of the fact that many premature cases are included in this according to the regulations in this State. Nineteen mothers died—8 white and 11 colored. These are classified as follows: accidents of pregnancy 4, 1 white and 3 colored; puerperal hemorrhage 4, 2 white and 2 colored; sepsis 5, 2 white and 3 colored; eclampsia 5, 3 white and 2 colored; ill defined 1.

*Read before the Seaboard Medical Society, Norfolk, Virginia, December 7, 1921.

This shows that in Norfolk one woman dies for each 163 labors. It is further interesting to note that 108 babies die under one month, 57 white and 51 colored, and 251 die under one year. Holmes, in a paper read before the American Gynecological Society at its last meeting, made the statement that the death rate for women in hospitals is as great today as it was one century ago, this he attempts to prove by statistics. He also quotes the vital statistics of Newark to show that it is safer to be delivered by a midwife than by a doctor in a hospital. He concludes that this state of affairs is due to too frequent use of modern obstetric operations, such as induction of labor, forceps, cesarean sections, versions, etc. Holmes recognizes the wonderful diminution in mortality rates for infants and women in private practice.

This suggested to me that some light might be thrown on the subject by a study of our records in private practice, and if found to be better than those in other work, to consider the essential differences which cause the improvement. I decided to go a step further and consider the records of the discharge examination in order that we might also consider the end results as to morbidity. For the purposes of this comparison, I have selected 150 private case records. These are not selected in any sense other than the requirement that they must have been seen more or less regularly during pregnancy. In this series no mothers died. There was no stillbirth. One baby died of cerebral hemorrhage six hours after delivery. It was rather surprising to me to find that twenty of these cases showed a retroverted uterus. Three were known to be old cases, probably others were. Two were cured by simple replacement. Sixteen were corrected by the hard rubber pessary. Two were not relieved, one an old case with adhesions. Ten cases had toxemia to a degree which was regarded as threatened eclampsia. No case developed eclampsia. In eleven cases the perineum was relaxed, nine of these were in multipara and were old lacerations. One cervical polyp was found. Eight needed treatment for laceration or erosion of the cervix. Two were potential prolapse cases.

This report is not made for the purpose of proving superiority for any method of treatment. The methods used, in a large measure, were such as are generally accepted as conservative and safe. Almost every method of delivery was used. One case only had a cesarean section and this for central placenta previa and toxemia. There were no high forceps operations and only one at the superior strait. Low forceps were used in a considerable number of the primipara. Practically all were delivered under anesthesia. Induction of labor by bags was done on four cases. In a number of others, labor was induced by the castor oil and quinine method either for toxemia or a disposition to go over time. The number of cases is very small, but no doubt furnishes

a fairly accurate cross section of this work. The results are practically the same as those of many others who are giving thought to this matter. I have not included in this report clinic cases, or those not having been seen before admission. It is this class which furnishes the high mortality rate. All cases of eclampsia which I have seen have been in this class. Certainly so far as our present knowledge is concerned, we cannot hope by adopting any method of treatment now available to make a very great change in the mortality rate in eclampsia. We cannot make very much change in the death rate in cases of placenta previa, which have been admitted after having been exsanguinated and possibly infected. We cannot show the best record in cases of contracted pelvis when they have been long in labor and also probably infected. It seems unnecessary for our present purposes to consider our records of these emergency cases. We will admit that they are unsatisfactory and probably as bad as any under similar conditions. Our own mortality statistics suggest this. Certainly our records in private work show a very striking contrast with the mortality statistics of the country in general.

Now, let us see what the essential differences in the management of these two classes of cases are. It is my belief that there is no essential difference other than prenatal care and a nearer approach to aseptic technic in delivery. In the private cases we have practically no deaths from eclampsia or sepsis, and rarely a fatal hemorrhage. It is these conditions which roll up such large death rates. In my own series ten cases were certainly potential eclamptics. They were treated by methods well known to all and none developed eclampsia. If we have any number of cases of eclampsia, we can expect a fairly definite mortality. So I conclude that our only method of diminishing this item, is to prevent the eclampsia, which certainly seems to be quite possible in practically all cases. Nearly all of my cases were delivered in hospitals. It seems an error to charge to our hospitals bad results in cases which have already been infected or allowed to become eclamptics before admission.

I do not believe we can charge the present high mortality rate to any particular operation or choice of methods of delivery, for reasons which I have already pointed out. As to placenta previa, certainly the greater number of these patients give warning before the fatal hemorrhage.

If we admit that the above is true, we cannot hope to greatly improve our mortality statistics in obstetrics until we have given the advantage of suitable prenatal care to all pregnant women and the same degree of aseptic technic during delivery, which is now generally practiced in general surgery. As to the midwife, it seems unnecessary

to consider her results. The midwife should have no mortality, as the case gets into the hands of a doctor as soon as trouble comes.

Apparently in the past, very little attention has been paid to discharge examinations after labor. The comparatively large number of retroverted uteri in this series is not pleasing to me. Knee-chest and face positions have been used as routine to prevent this. I am aware that many symptoms have been attributed to the retroverted uterus which were really caused by something else. Apparently some regard the retroverted uterus as deserving little consideration. Probably no one will argue that a woman is better for having it. It is generally admitted that some pathology is due to it. Personally I believe that it is well worth our effort to see that obstetric cases are not finally discharged until the uterus is in position, if this can be done by simple office treatment.

For replacing the uterus, I use a method which was suggested by J. C. Hirst. The double tenaculum is first placed on the anterior lip of the cervix and the fundus released by gentle traction. The tenaculum is then held by an assistant, while the fundus is lifted and held forward by two fingers in the vagina. The assistant now shoves the cervix downward and backward, and thereby assists the other hand on the abdomen in catching the fundus and bringing it forward. This little maneuver makes it unnecessary to use the knee-chest posture and is much more effectual and satisfactory. After the uterus is replaced, it is in some cases let alone, in others the Smith or other hard rubber pessary is used.

In the event that this should fail to relieve the retroversion, we can advise the patient of the condition in order that she may return later for further treatment, if symptoms should arise.

Our attention has often been called to the train of symptoms following chronic irritation and infection of the cervix. Evidence seems to show that it has much to do with the development of cancer. We know that the cancer of the cervix is nearly always a disease of the parous woman. Is it not possible that one of our most effectual weapons against cancer may be the early treatment of these conditions of the cervix, which are found at the time of the discharge labor examination? It seems probable that at least one case in twelve needs some treatment of the cervix after labor. The condition of the uterine supports which is found after labor, together with the condition of the perineum, is information which will be of great advantage in the subsequent management of the patient. It seems unlikely that many old cases of prolapsus uteri, cystocele and rectocele will be found if the patient is acquainted with conditions following her labor which will probably give this result in later life.

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THE INDICATIONS FOR THE MANAGEMENT OF THE CORD STUMP AFFORDED BY STUDY OF THE PHYSIOLOGY OF THE NAVEL IN THE NEWBORN

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THE human infant shares with the young of all the other mammalia the necessity of avoiding certain dangers inherent in the severance of its vascular connections with the placenta, the separation of the remnant of the umbilical cord, and the healing of the wound left at the navel. In the present paper it is proposed to consider only the normal navel and cord, and to disregard the developmental defects of this region, such as Meckel's diverticulum, patent urachus, umbilical hernia, amnion navel, etc., all of which may threaten the child's life. Normally, then, the dangers to which the infant is subjected from the nature of the processes going on at its navel are hemorrhage and infection. For the prevention of each of these Nature has provided a physiologic mechanism, which, I believe, it may be profitable to examine before considering the ideal technic to be made use of by the obstetrician in his management of the umbilicus.

In all animals the separation of the cord from the afterbirth involves the tearing through of the umbilical vessels and opens up a channel for possible bleeding, venous, arterial, or both. Since, with the possible exception of some of the domestic animals, the bleeding vessels are not tied, except in the case of the human infant, it is obvious that the natural provisions for hemostasis here have stood the test of time as to their efficiency. In the case of lower animals, however, it must be pointed out that the means by which the severance of the cord is effected tend to favor hemostasis by occlusion of the vessels. In many species the cord is bitten through by the mother, in others, the dropping of the fetus from the mother's body results in its being torn through at a varying distance from the navel, or the mother or young animal, in struggling to get up from the recumbent position, produces the same result. In either event, instead of a clean-

cut incision of the umbilical vessels with a sharp instrument, we have vessels which are crushed or torn through, and well-known surgical principles teach that hemorrhage under such circumstances is reduced to a minimum.

It would be interesting to know to what extent the wellnigh universal practice of tying the cord of the human baby had its origin in necessity for controlling hemorrhage from vessels severed by the unphysiologic use of a sharp instrument. It intrigues the fancy to imagine some primitive, prehistoric, Neanderthal midwife resorting to a ligature of deer skin to control a hemorrhage produced by her use of the razorlike edge of a flint skinning knife to which she had been prompted by the urge of a vaguely felt esthetic repugnance to more primitive, if better tried, methods. In any event, ligation is at present the accepted procedure in both the civilized and the savage. Engelmann, however, in his interesting work, "Labor among Primitive People," does state that among a few savage tribes the mother still severs the cord with her own teeth.

That these many centuries of cord ligation have not served to rob the baby of its ability to secure itself from death from hemorrhage are shown by the many instances in which precipitate labor with rupture of the cord has failed to produce it. Harrar has reported 3 cases in which the cord was torn through from 6 to 10 inches from the body, without hemorrhage, and 1 case in which the mother cut the cord, without ligature, in which the baby died from hemorrhage. I recall a case in my own practice where a woman was delivered precipitately as she was preparing to go to the hospital. The baby fell to the floor as the mother was walking across the room. When seen an hour later the cord was found torn through about eight inches from the naval. The baby was uninjured by its fall, and there had been no bleeding. Several of my friends have reported similar incidents to me. In another case in which the cord had been clamped some distance from the body, pending the transfer of the baby and mother to the hospital, I cut the cord off flush with the navel, without preliminary crushing, about four hours after birth. There was no bleeding. A sterile dressing was applied and the result left nothing to be desired. Negative evidence to the same effect is afforded by a study of the literature. The volume of the second series of the Index Catalogue of the Surgeon General's Library, containing the references to umbilical hemorrhage, covers the years 1893 to 1914 and gives 39 references to the subject. Study of all these articles discloses only one in which cases of primary hemorrhage from the umbilical vessels are reported. This is the Paris Thesis of Leriget, 1908, entitled, "Study of Umbilical Hemorrhages of Mechanico-Physiological Causation." This author reports 20 cases, 11 fatal, which he considers as properly classi-

fied under this title. He concludes that hemorrhages of this type are rare, and that they are due to absence of ligation or more frequently to improper ligation. The clinical data necessary to form an adequate conclusion as to the true character of the bleeding are, in the majority of the cases, entirely lacking. I am of the opinion that most of them are simply unusually early cases of secondary hemorrhage.

What, then is the physiologic mechanism for the control of unbilical hemorrhage which is shared by the human infant and the lower forms? The factors concerned in the usual biochemical phenomena of blood clotting are of course operating here and need receive no further consideration. The mechanical factors involved, however, differ for the arteries and the vein and merit separate consideration.

According to Cullen, the large development of the longitudinal muscular fibers of the arterial wall is the main mechanical factor in controlling arterial bleeding. Under the influence, presumably, of thermic and mechanical irritation following the birth, the contraction of these fibers causes a retraction of the vessels and a thickening of their walls which serve to occlude their lumina. The perfection of this physiologic ligation is shown, according to Demelin, by the fact that these arteries will, after birth, remain impermeable under pressures up to 120 to 160 mm. Hg. whereas the normal systolic pressure in the newborn is only 60 to 65 mm. Hg. If, therefore, the texture of the umbilical arteries is normal, they will have a retractile and contractile power sufficient to resist the most vigorous cardiac impulses.

In the case of the umbilical vein no such anatomic arrangement is present, and hemostasis is secured through the action on the circulation of the newly established function of respiration. Under the influence of vigorous and normal breathing, the aspirating power of the thorax is entirely sufficient to drain the umbilical vein into the internal viscera and maintain it in an empty and collapsed condition, most favorable for the initiation of the thrombotic and organizing processes which render it rapidly impervious.

Having escaped the danger of hemorrhage, the second hazard to be passed by the newborn is that of umbilical infection. The local conditions would seem to be most favorable for its occurrence. The gangrenous remnant of the cord, moist and kept warm by the adjacent living tissues, and containing freshly thrombosed vessels in direct communication through the navel with other recent thrombi would seem to fulfil all the requirements for bacterial invasion. Yet umbilical infection, at least in serious form, is a comparatively rare condition. And if we are too prone to attribute this fact to our modern aseptic technic, we should bear in mind that the young animal, born under conditions which are the very antithesis of sepsis, escapes infection in the vast majority of cases. This is not invariably true.

Necrobacillosis of the navel and joint ill are two conditions affecting domestic animals in the first few days of life. Both, however, usually occur epidemically, the former having caused the death of 1500 lambs out of 5200 born on one ranch in one season. Here again we see an analogy to human conditions, for the literature shows that umbilical infection is very prone to occur epidemically in maternity hospitals. What, then, is the secret of the comparative immunity to infection possessed by the young animal, despite the local conditions at the navel which apparently favor it? Of course the usual mechanisms for the control of bacterial invasion are operative here and need no further elucidation in this connection. To my mind the local factor mainly responsible for control of infection is one which, under normal conditions, rapidly turns the apparently favorable local situation into a very unfavorable one, namely rapid dehydration of the cord. If the navel of the newborn kitten, puppy, or lamb be examined in the first few days of life, the remnant of the cord will be found to merit the term navel-string applied to it in popular parlance, for it is represented by a withered, absolutely dry and almost brittle string-like body, usually of considerable length in comparison to the size of the animal. Technically the cord is undergoing a process of dry gangrene, and because of its almost complete dehydration is a practically impossible medium for bacterial development.

Let us now examine the usual method of dealing with the cord and navel in the light of the physiologic processes detailed above. This method may be fairly summarized as follows: When pulsation has ceased, or become much weakened, the cord is ligated from 2 to 5 cm. from the navel and severed with scissors distal to the ligature. It is usually then treated with some antiseptic, frequently iodine, and securely wrapped in sterile gauze, frequently a roller bandage being applied, and this dressing is tied in place and left to drop off with the cord. This technic I believe to be open to the following criticisms: An unnecessary amount of dead tissue is left, probably about 2 gms. There is no drainage provided, except back into the body of the infant, for the ligature effectually seals the distal, cut end. This lack of drainage, together with the thick dressing, inhibits evaporation and by preventing the physiologic process of rapid dehydration tends to convert what should be a process of dry gangrene into one of moist gangrene, thus favoring rather than inhibiting infection, and undoubtedly delaying the occurrence of separation. Such conditions can only increase the incidence of infection and, therefore of secondary hemorrhage. In this connection it may be pertinently asked whether the delayed separation of the cord interferes with the contraction of the umbilical ring sufficiently to be a factor in the production of the frequently observed umbilical hernias of young infants. Naturally the argument

immediately suggests itself that the accepted method of procedure gives satisfactory results all over the world. To this it may be replied that we are dealing with the condition which of all others most frequently receives surgical care, and that, while the physiologic mechanisms involved may ordinarily overcome a handicap imposed upon them by an error in our art, if they fail to do so in only 0.1 per cent of the cases, the resulting variation in the mortality rate would not be readily detected and yet would cause the unnecessary annual loss of 2500 babies in the United States alone.

The literature on the ligation and care of the umbilical cord is voluminous; that in opposition to the accepted methods is the reverse. A. F. A. King had privately printed in 1867, "An Essay on the Ligation and Management of the Umbilical Cord at Child Birth," in which he advocated leaving the cord unligated in order to promote free drainage, prompt desiccation, and rapid separation. Dickinson has advocated the immediate complete amputation of the cord stump and the closure of the wound with a suture ligature. Flagg, Buckmaster, and Ballantyne have suggested similar procedures. Operations of this character will undoubtedly yield satisfactory results in competent hands. It would seem, however, that they substitute for physiologic processes which can be so handled as to render them perfectly safe, a surgical procedure capable of doing damage in the hands of the unskilled or careless. The article of Rendleman and Taussig bears on this point. These investigators compared the results in two series of 225 cases each, using the Dickinson technic in one and the ordinary ligation technic in the other. They noted a temperature of 100 or over in the first ten days in 37.7 per cent of the operated cases, as against 22.7 per cent in the ligated cases. The initial weight loss was also greater in the operated series, although compensated by a more rapid gain after the fifth day. These phenomena were attributed to the greater shock and infection of the operated cases at first, followed by quicker healing and less drain on the infant's vitality from prolonged attachment of the cord. Cook advocates tying the cord as close to the skin margin as possible in order to secure free drainage. With this technic he reports separation of the cord on the third day in 70 out of 75 cases. There was fever in 20 per cent of 50 cases in which the cord was ligated 2 cm. from the skin margin, as against fever in 3 per cent of the 75 cases treated according to his own technic.

For the past few years I have been employing a technic in the management of the cord stump and navel which appeals to me as being based on sound physiologic principles and has afforded me uniformly satisfactory results. It is in no sense original, as my attention was first called to it by the statement of a nurse that it was being successfully employed at a Philadelphia maternity. It is carried out as fol-

lows: When the respiratory function has been normally established, and pulsation in the cord has ceased or become limited to the fetal end, traction is made on the cord perpendicularly to the body surface, in order to draw the skin-cuff out to its full extent, and, after painting with 50 per cent tincture of iodine, a clamp is placed immediately adjacent to the skin margin and locked in place. Care is exercised to avoid catching the skin edge in the bite of the forceps. The cord is then cut through as close to the distal side of the forceps as possible and a few turns of a sterile gauze bandage are thrown around the clamp and stump in the ordinary figure of eight applications. After having been left in place for one hour the clamp is gently and carefully removed by the nurse. At this time the cord stump is represented by a narrow zone of congested cord tissue about ⅛ inch in thickness, surmounted by a transversely compressed translucent zone, of paper thickness, the width of the jaws of the clamp. The stump is again touched with 50 per cent tincture of iodine and covered with a dressing of sterile gauze, held in place by a binder. Unless soiled this is not disturbed until the fourth or fifth day. The baby is not tubbed. Twenty-four hours after birth inspection of the navel discloses the remnant of the cord as a small, dry scab in the bottom of the depression. In the great majority of the cases this scab has separated and comes away when the dressing is changed on the fourth or fifth day. I have now employed this technic in over 300 cases without any mortality or morbidity referable to the cord stump or navel.

The first question to be asked, of course, will be as to the efficiency of the hemostasis, both primary and secondary. This has been entirely satisfactory. In most cases there is a small amount of oozing from the cord stump, sufficient to make a small blood stain on the gauze dressing. This has been alarming to nurses and internes occasionally and has been controlled by reclamping or compression with a gauze sponge. Personally I doubt if further interference was necessary except in one case. In this case there was quite decided and persistent venous hemorrhage after the removal of the clamp, which was easily controlled, however, by reclamping. This was a baby delivered spontaneously after a long, tedious, R.O.P. labor, with the cord tightly drawn twice around the neck. There was marked cyanosis, which persisted for several days, respiration was established with difficulty, and there were protrusion of the tongue and nystagmus, pointing to cerebral irritation. The baby, however, made a perfect recovery. This type of case, I now believe should have the cord ligated as close to the navel as possible, as the uncertainty of the aspiring action of the thorax predisposes to venous hemorrhage. (The suggestion of King, that in these cases of cyanosis the cord be cut and allowed to bleed, in order to relieve the embarrassed right side of the heart, would

seem to be worthy of trial and investigation.) There was no case of secondary hemorrhage. In one case a small granuloma of the umbilicus had to be removed when the baby was five weeks old. In only one case was treatment for a dilated umbilical ring necessary.

This method of treating the cord stump seems to me to possess the following advantages: (1) The technic is simple and readily employed by anyone. (2) The cord is practically entirely removed, leaving a minimum of devitalized tissue to drain toxins into the infant's circulation. (3) Drainage from the minute amount of cord tissue remaining is facilitated. (4) Rapid dehydration is assured, thus preventing infection and insuring early separation. (5) In normal infants efficient hemostasis is secured by means which are entirely physiologic. In "blue babies" ligature close to the umbilicus is probably indicated. (6) The aftercare of babies thus treated is greatly facilitated.

In looking over the literature I find that Liebman, Hirsch, and Stoll in their "Inaugural Dissertations" have published statistics of a practically identical technic employed at Freiburg. This is described by Stoll as follows: "The cord is cut between two Kocher clamps, and the child rubbed with sterile oil. The cord is then clamped with a third clamp immediately at the umbilicus. This clamp is allowed to remain for ten minutes and is then removed and the paper-thick stump dressed with sterile gauze. The child is not bathed." In 3060 cases in which this technic was employed there was no mortality or morbidity attributable to the navel; bleeding in only 0.16 per cent; and the cord stump had separated by the seventh day in 73.72 per cent. In 264 cases treated by the old ligation method there was a morbidity from the navel of 0.87 per cent; a mortality of 0.87 per cent; no bleeding; and the cord stump had separated by the seventh day in only 51.72 per cent.

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STONELEIGH COURT.

USE OF LUTEIN SOLUTION HYPODERMICALLY FOR THE CONTROL OF NAUSEA AND VOMITING OF PREGNANCY*

By Titian Coffey, M.D., F.A.C.S., Los Angeles, Cal.

FOLLOWING the suggestions of Hirst, in September, 1919, I began the use of hypodermic injections of Hynson and Westcott's J.C., solution of corpus luteum. To date sixty-two selected cases have been treated by this method. The total number of injections given in the sixty-two cases was four hundred and ten, making a general average of about six and a half injections per patient. The least number of injections received was one and the highest number given to a single patient was twenty-five. The following little table shows how they averaged:

2	cases	1	each	4	cases	6	each	3	cases	12	each
4	"	2	"	4	"	7	"	1	"	16	"
2	"	3	"	4	"	8	"	1	"	17	"
8	"	4	"	3	"	9	"	1	"	21	"
21	"	5	"	2	"	10	"	1	"	25	"
				1	"	11	"				

It will be noted that the greatest number of patients received five, the highest number of injections was twenty-five.

Fifty-five cases of the series improved more or less rapidly after beginning the injections, giving a total of 88.6 per cent improved, about the same average as Hirst reports. Six of the series aborted; one from overexertion four weeks after all gastric symptoms had ceased and injections stopped; one from a rough auto ride; two therapeutically, the first on account of active tuberculosis with hemorrhage and the other on account of uncontrollable vomiting. The fifth brought the abortion about herself, and I retired from the case, and the sixth aborted following an injection. The last is the only one in which I thought there might be a connection between the injection and the miscarriage and I will speak of it again with the case reports. In only one case was failure absolute, the one of uncontrollable vomiting mentioned above and to which reference will be called later.

The technic is to prepare the site of injection, using the deltoid preferably, with green soap followed by alcohol with enough friction to create redness of the skin. The solution is injected deeply into the muscle and the patient, if ambulatory, is instructed to return home and keep quiet for the following twenty-four hours; also if there be

*Read before the Santa Barbara County Medical Association, March 28, 1921.

any soreness at the site of injection to apply a compress of equal parts of alcohol and water.

If the discomfort is severe, patient losing all meals and nausea constant, the injections are given daily but usually they are given every other day, using the deltoids alternately. If the injection is given subcutaneously the reaction is quite severe but if given deeply in the muscle the discomfort is trifling. Occasionally a patient complains of dizziness after the injection and some state the following twenty-four hours their nausea is increased but by the second morning they are "feeling fine."

It is interesting to note the rapid clearing up of the distress and the return of appetite, usually after the second injection. Many patients state they feel much less languid and much more vigorous after the injections. So far I have seen no case of anaphylaxis or any alarming symptoms following the treatment.

As a summary of the results obtained it may be of interest to review briefly in outline some of the more interesting cases.

CASE 1.—Para i, age twenty-nine, about six weeks' pregnant, constipation and nausea severe, with considerable vomiting. Received eight injections in all and did not improve materially until after the sixth. This case delivered later by cesarean section, on account of generally contracted pelvis and nonengagement of head after labor began. Baby had spina bifida involving the last two dorsal and all the lumbar vertebrae and died three weeks later with a well developed hydrocephalus.

CASES 2 AND 3 received nine and eight injections respectively, and steadily improved.

CASE 4.—Para ii, age twenty-eight, one previous accidental abortion between the fourth and sixth week. Seen in consultation at the sixth week of pregnancy, nausea and vomiting severe for past two weeks. Patient given daily injections of 1 c.c. lutein and began to improve after the third injection, but it was only after the tenth that she was in condition to take solid food and the vomiting entirely ceased. She received twelve injections in all and left the hospital on October 9 in a very satisfactory condition. Three weeks later on October 31 she aborted spontaneously after having done some heavy housework. I could see no connection between the use of the lutein and the abortion.

CASE 9.—Para i, age twenty-one, received twelve injections. She was vomiting all her meals at first but slowly improved after the first injection.

CASE 11.—Para ii, age twenty-one, had four injections, headache followed first injection and after this was given one-half c.c. instead of the full ampule for the following three injections. Rapid improvement.

CASE 12.—Para ii, age twenty-three, had four injections and rapidly improved but it was necessary to do a therapeutic curettage at the end of the third month on account of active tuberculosis with hemorrhage.

CASE 19.—Para iv, age twenty-eight. This case is of interest because during three previous pregnancies it had been necessary to put her in the hospital from the sixth to the twelfth week on account of hyperemesis. Her case three times previously had been of extreme severity necessitating rectal feeding and large doses

of bromides. At her third pregnancy she aborted spontaneously at the eighth week undoubtedly on account of her extreme toxemia. At the fourth pregnancy she reported when six weeks advanced, with beginning severe nausea and vomiting. This patient received six injections at three day intervals with improvement after the first and passed through the next few weeks with no distress at all. She was the most brilliant and satisfactory case of the series.

CASE 23.—Para ii, age twenty-six. Was vomiting all meals when she came under observation; six weeks advanced but immediately began to improve after the first injection. She received seven injections in all.

CASE 33.—Para ii, age thirty-one, had had stormy pregnancy two and one-half years previously in Arizona. Labor was induced at the end of the eighth month on account of albuminuria, severe vomiting and preeclamptic symptoms. Baby weighed five and one-half pounds. She reported to me when about two months pregnant and was suffering with persistent nausea and vomiting. Her improvement, though gradual, was not so satisfactory as I had anticipated. She received sixteen injections in all from May 18th to June 12th and she got through the summer fairly well, but in November, vomiting returned accompanied by pain. A diagnosis of duodenal ulcer was made and confirmed. Her condition became so grave on account of persistent bloody vomitus that preparations were made for termination of the pregnancy but fortunately the night preceding the expected operation she went into labor spontaneously, five weeks before her date of confinement and was delivered of a six pound baby. From then on her improvement was steady and satisfactory.

CASE 34.—Para iii, age thirty-one, received ten injections and was improved but miscarried spontaneously following a rough automobile ride. Six months later she was operated upon for a large ovarian cyst which may also have been a factor in her abortion.

CASE 36.—Para ii, age thirty-five. This is the one case of my series in which the injections though helpful at first were a complete failure. This woman received the highest number of injections, twenty-five in all with no improvement. I had seen the patient two years previously in consultation. She was then about three months pregnant and was in desperate straits, suffering with a severe hyperemesis, accompanied by profound acidosis. Her stomach had rejected everything for days. She was greatly emaciated, very weak, had rapid pulse, and subnormal temperature. I advised an immediate emptying of the uterus which was done, and the following day and in fact for the next week the patient was in great danger. She then slowly improved and finally made a complete recovery. In the second pregnancy nausea and vomiting began about the sixth week. It was not severe and at first she seemed to be improved by injections of lutein. There was a psychic element in this case that had to be taken into consideration. Her first experience had left a bad mental impression, also she had recently received a severe shock caused by the sudden death of a member of the family. At first her condition improved after receiving the injections and she was able to hold and assimilate food fairly satisfactorily. Suddenly one morning the nausea and vomiting returned, the urine became loaded with acetone and diacetic acid, albumin and casts appeared and the patient began vomiting blood. Her condition became so alarming within the next forty-eight hours it was necessary to terminate the pregnancy immediately. Severe hemorrhage accompanied the operation and the succeeding twenty-four hours her condition was bad, but she eventually made a slow recovery.

CASES 37 TO 53 inclusive, improved under treatment.

CASE 54.—Para i, age twenty-one. This patient when three months' pregnant

came under my care. One hour following her second injection she began to flow and three days later aborted spontaneously. It is a question as to how much the injection had to do with the abortion. Patient after leaving office walked a considerable distance to visit a friend and while there was taken with uterine cramps. Sedatives were given without avail. I have been inclined to believe overstimulation of the uterus from the injection, together with fatigue following the long walk, was responsible for this abortion.

CASES 55 TO 62 inclusive improved steadily, without comment.

CONCLUSIONS

1. My experience with dry extracts of corpus luteum and placentæ tissues by mouth have been unsatisfactory. These substances are probably changed during the process of digestion and do not attain the goal desired.

2. In hypodermic medication with lutein for the relief of the nausea and vomiting of pregnancy, I believe we have a remedy that will prove of great benefit in a large number of cases. Those not actually cured are at least considerably benefited and the distress is held under control.

3. Satisfactory results are obtained in a majority of cases.

4. The earlier the injections are begun the more gratifying the results.

5. The drug is apparently harmless, easily administered and leaves no unpleasant after effects.

6. There seems to be no increased tendency to abortion if the patient remains quiet following the injections.

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MARSH-STRONG BUILDING.

PRIMARY CARCINOMA OF THE FEMALE BLADDER, WITH REPORT OF A CASE*

By I. S. Stone, M.D., Washington, D. C.

THE object of this paper is to report a case in which early excision of a supposedly malignant bladder tumor, by combined vaginal and abdominal operation, has resulted in an apparent cure.

This subject appears to have been given rather scant attention in the literature. We find but little definite or specific description of the disease, its frequency, prognosis, or results of special operative treatment in female patients.

RELATIVE FREQUENCY IN MALE AND FEMALE PATIENTS

Albarran (footnote quoted by Watson and Cunningham) gives the proportion as 14 to 20 per cent in women and 80 to 86 per cent in men; while Winckel (quoted by Mundé) reported 37 cases, 33 of which were in women, or eight times as many as in men. These statistics are, of course, unreliable, having been published several years ago.

We have seen many cases of cancer of the bladder associated with cancer of the uterus, but only two of which were primary as far as we could discover. Allowance must be made for those cases seen in ward practice too late for accurate observation. By most of my associates cancer of the bladder has been considered hopeless from the start. My belief now is that this is wrong and that the present day efficiency in diagnosis and careful study will change this gloomy outlook to a more hopeful promise. One of the most disappointing features of case reports in the literature is the lack of a follow-up study of patients. Certainly there is no substantial progress possible until we know more than the immediate result of treatment.

CASE REPORT

Miss —, white, sixty-three, single and virgin, consulted me in February, 1920, on account of irritable bladder, with bloody urine. She had always been healthy since childhood, weighed 150 pounds, had the appearance of good circumstances and had no vices. At the time of her visit she was passing bloody urine every day, which she thought uninfluenced by exercise. After she came under observation we always found blood in specimens examined microscopically. She had not had any severe or alarming hemorrhage at any time. Blood examination showed 80 per cent hemoglobin and no constitutional disease, with blood pressure 130 systolic. Her urine was normal apart from the usual epithelium, shreds and elements from the growth in the bladder. Pelvic examination gave but little information. It was discovered that she always had residual urine in her bladder; generally two

*Read before the Southern Surgical Association, Pinehurst, N. C., December 13, 1921.

or three ounces. With a Kelly cystoscope a mass near the left ureteral orifice could be seen which had a ragged surface and was dark red in color, which easily accounted for the bloody urine and irritable bladder. She had not suffered severe pain but was obliged to empty her bladder at intervals of a few hours. This circumstance I now believe was partly due to the inability to completely empty the organ. (Incidentally, her bladder capacity was somewhat limited, being about ten ounces.) My colleague, Dr. G. Brown Miller, examined the patient at my request and gave an unqualified opinion that we had to deal with a malignant growth. He advised operative treatment.

The growth, as seen through the cystoscope, appeared to be about two centimeters vertically and not as wide as it was long. It was placed immediately adjoining the left ureteral orifice, being rather more above than below that point. The outline was in sharp contrast to the adjoining mucosa, being abruptly projected out from the bladder wall, which was practically of normal appearance. The growth was sessile and answers well to the description of papillomatous carcinoma.

Preliminary Treatment.—In order to sterilize the mucosa as well as possible a 2 per cent solution of protargol was injected in the bladder on alternate days for a time; the same treatment as that used in cystitis. It was seen that distention of the organ beyond a certain point always caused pain and increased bloody return. Operation, April 1920. The first steps of the operation were rather tedious; owing to the small size of the vagina. However, the anterior vaginal wall was opened in the median line and the bladder carefully and thoroughly separated from all attachments at its base, especially on the left of the median line and from the anterior surface of the uterus, an easy matter to those accustomed to the performance of vaginal hysterectomy or an interposition operation. The region about the ureter was thus investigated, the growth located, and its size estimated. Then the abdomen was opened and the operation completed from above. I wish particularly to call attention to the ease with which the operation was completed after the base of the bladder was freed. We could raise the organ considerably above its usual position and there was no special delay in the excision of the growth as the ureter was easily brought into view. In this case the ureter was displaced slightly, but not entirely separated from its lateral attachments, and was sutured in position as the wound was closed. A line of small plain catgut sutures closed the bladder and were tied on the inside. A second row of No. 2 catgut was added on the outside but under the peritoneal cover. A drain tube provided with fenestra was sutured to the anterior wall of the uterus and brought into the vagina to act in case of leakage, possible infection, or hemorrhage. As a matter of fact, there was need of this which we did not expect, for a small amount of urine escaped through it for more than a week. A selfretaining catheter was placed in the bladder. Although this catheter was doubtless retained within the bladder it is almost a certainty that its lumen was allowed to close and the leakage due to that mishap. However, there was at no time any serious delay in the patient's recovery. Complete and satisfactory wound closure proceeded rapidly and without infection. The bladder functionated satisfactorily in ten days.

The wound in the bladder extended from the apex to a point well below the left ureteral orifice and the growth excised with scissors, leaving a good margin of healthy tissue outside of the involved area. The pathologist of the hospital reported an "epithelioma" and I regret that the specimen has been lost. No treatment was required for cystitis, and although the patient has been kept under observation for nearly 20 months, no untoward symptom has occurred. The growth had involved the musculature of the bladder, but there was no evidence that the

disease had extended outside. This, however, may have been due to the absence of lymphatics in the region of the ureteral orifice.

At my request, the patient came to my office December 5, 1921.* She reported herself well and we found her bladder in excellent condition, although she was still unable to completely empty it voluntarily before examination. She has gained in weight and feels confident that she is permanently cured. The urine is absolutely normal.

The description of operations for cancer upon the female bladder by the surgeons named below will prove interesting, the more so because they comprise about all of the special work of gynecologic operators in this field.

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Pawlik: Verhandl. d. X Internat. med. Cong., 1890, Berlin, 1891, 111, 8, Abst. 101-106, describes the first cystectomy upon a female patient for cancer of the bladder. He first sutured the ureters in the vagina and at a second operation a month later removed the bladder. The operation was performed in 1888. A year later, he says, the patient made a long journey to Berlin, spent the day in seeing the great city and was apparently enjoying life. *Munde, P. F.:* Am. Jour. Obst., New York, 1886, xix, 267, describes what appears to have been the first reported case in America. *Martin, F. H.:* Am. Obst. and Gyn. Jour., Chicago, 1900, May, xvi, 395. *Mann, M. D.:* Am. Jour. Obst., New York, 1906, p. 263. *Reynolds, E.:* Interstate Med. Jour., St. Louis, 1914, xxi, Extirpation by Way of Vagina. *Webster, J. C.:* Am. Jour. Obst., New York, 1905, lii, 873. *Boldt, H. J.:* Am. Jour. Obst., New York, 1906, p. 263.

In several reports of removal of uterus and resection of the bladder for cancer it would seem difficult to determine if these merit classification with the rest, as they were probably secondary rather than primary carcinomata.

STONELEIGH COURT.

*More than 18 months since operation.

HEMORRHAGE DURING THE EARLY MONTHS OF PREGNANCY*

By Robert Young Sullivan, M.D., F.A.C.S., Washington, D. C.

Associate Professor of Gynecology, Georgetown University; Attending Gynecologist to Columbia, Providence and Municipal Hospitals and Consulting Gynecologist, Government Hospital for the Insane, Washington, D. C.

A DISCUSSION on hemorrhage during the early months of pregnancy at once resolves itself into a consideration of the causes, diagnosis and treatment of the termination of pregnancy in the early months, both of the intrauterine and ectopic gestation. Inasmuch as the great majority of pregnancies are uterine and that the underlying causes of hemorrhage for both are for the greater part similar, ectopic pregnancy should be considered only in connection with the chief pathologic factors that cause bleeding. Abortion and miscarriage are terms that cover the hemorrhagic processes, the former, before the completion of the sixteenth week and the latter before the twenty-eighth week of gestation.

The frequency of hemorrhage during these periods is great, probably greater than we are able to truly estimate, since many are deliberately concealed and hospital statistics are faulty because only the more extreme types occur in clinics or in the hands of specialists who are interested in collecting statistics on this point. It is very frequent, however, being variously estimated from one in four to one in sixteen pregnancies. It is thought to be more frequent in multipara than primipara because of the greater number of the former and also because of the greater probability of pathologic conditions incident to the injuries of former pregnancy and the marital state. It is also greater among those who reside in the city and among the poorer class than those who live in the country and among the well to do. These conditions are possibly brought about by the stress of city life, the lack of healthful surroundings, conditions, and the nearness of the criminal abortionist.

The etiologic factors causing bleeding in early pregnancy have been classified as paternal, fetal and maternal. We may look upon it as the manifestation of some pathologic influence either without or within the uterus. Nearly all maternal causes are due to intrinsic uterine pathology. Returning for the moment to the first classification, paternal, fetal and maternal, we may say that frequently ova are fertilized with spermatozoa from such weakened and devitalized male individuals that the future development of the product lacks the impetus to attach itself and reach maturity. This is seen in

*Read before the Medical Society of the District of Columbia in a Symposium on Obstetrical Hemorrhage, February 23, 1921.

syphilis, lead poisoning, the alcoholic and even the excessive user of tobacco. It is closely allied with the problem of systemic or functional sterility of the male. The lack of continued impetus may be the cause of uncompleted development and hence, bleeding with expulsion.

Much more important and reasonable are the theories of primary fetal death. In this group we have a large list of active, reasonable causes acting either upon the fetus directly, as in acute and chronic infectious disease or in a secondary manner, upon the membranes and placenta, including high temperature and direct infection of the fetus as in influenza; hypercarbonization of the blood as in pneumonia or tuberculosis of the extreme type, as the effect of toxins in the placental site transferred from the circulation of the mother as in scarlet fever, smallpox and syphilis. It should be said at this point that in recent years the view concerning the force of syphilis has changed, the majority believing that this disease is a large factor in the hemorrhage of the latter half of pregnancy but not so prolific in the first half. There are many instances however, where abortion in the early weeks is due to syphilis and the influence is directly upon the fetus itself. Syphilis contracted at the time of conception usually results in fetal death and abortion. Syphilis contracted during pregnancy, both parents being healthy previous to the time of conception, results in fetal death and hemorrhage during the early months. Syphilis acquired in the latter months may result in the child escaping. The placenta here limits the excursion of toxins. Syphilis causes glandular hypertrophy of the endometrium with consequent hemorrhage usually in the latter half of pregnancy.

The product of conception succumbs from placental disease due to endarteritis, red and white infarcts, apoplectic tendencies, also the presence of hydatidiform degeneration. Endarteritis has definite relationship to both bacterial and syphilitic infection and the subsequent changes in the vessels. The effect of infarction is responsible for many abortions, the fetus dying because large sections of the placenta are improperly nourished. Similar effects occur from direct bleeding by rupture of vessels as in apoplexy. Many instances of fetal death and ultimate extrusion are the result of monstrosities. Specimens collected and examined closely seem to bear out the view that cases of hemorrhage and expulsion result because irregular development has occurred which forbids complete development or any further progress. Considerable importance seems to be attached to this and it is hoped that its better understanding at later dates may explain the misunderstood habitual abortion.

Other causes that should be mentioned as occurring in this group and affecting the fetus are acute polyhydramnion, oligohydramnion and amniotic adhesions restricting development, thereby causing fetal death.

In the maternal group there are numerous causes suggested. By far the largest number of active factors occur here. They should be classified first, as those factors outside the uterus and secondly, those having definite pathology within this organ. In the first instance occur some of the aforementioned systemic causes, high temperature, acute and chronic infectious disease, toxemias of the mother, as nephritis, the exanthemata and hypercarbonization. These influences seem to bring about irritation of the uterus and uterine contractions. This is evident in enteric fever, acute septicemia, as following acute appendicitis, periuterine infection usually of gonorrheal origin, the influence of pelvic and abdominal tumors, also traumatism, both at distant parts and near the uterus. It is believed that the effect of traumatism in its relationship to obstetrical hemorrhage is directly proportionate to the shock and ensuing sepsis, and may be better borne early rather than late in pregnancy. Hemorrhage following traumatism in general is thought to be secondary to some more potent cause as endometrial changes, nephritis, syphilis, etc.

Nephritis as a cause of hemorrhage is a positive factor. It is clear that a nephritis in existence before pregnancy ensues becomes a great problem for these reasons, first, the tendency to irritation of the uterine wall because of toxemia, secondly, because of reduced oxygenation of the blood, but particularly because of the tendency to cause the endometrium to become hemorrhagic. In the endometrium of the nephritic there are found many small hemorrhages, sclerosis of blood vessels and infarction; also destruction of the chronic villi due to toxemia. These factors lead to fetal death, hemorrhage and abortion.

By far the most active groups of hemorrhagic influences in pregnancy are those associated with pathologic change in the uterus itself, including faulty developmental defects, anteflexion, infantile uterus, double uterus, and general hypoplasia, all of which tend toward bringing about an irritable uterus. Again we have the presence of new growths, polypi, benign and malignant tumors, also injuries at previous confinements as laceration of the cervix and pelvic floor, retroversion and prolapse. These conditions all bear directly in changing the circulation and the endometrial lining, thus bringing about active or passive congestion which interferes with the proper attachment and maturity of the fertilized ovum.

The most prolific factor in hemorrhage is a disturbed endometrium, either the atrophic or hypertrophic type. From these causes there are many bleedings, probably more than all others. The influences that act from without, already mentioned, favor an originally developed anomaly here. There is present in many instances a condition independent of outside irritation, infections or tumors where there is increase in the glandular elements in the uterine mucosa which predisposes to hemorrhagic changes that separate the attachments of the

product of conception. These conditions are accompanied by frequent hemorrhages into the endometrium which are inconsistent with the further course of pregnancy and with the doubtful exception of monstrosities probably constitutes the largest single cause of termination of pregnancy with early bleeding.

In ectopic pregnancy the same pathology is found. Usually the same conditions occur in the endometrium of the uterus as in the normal uterine pregnancy except that a thinner layer of fetal decidual cells is present. Hemorrhage occurs through the uterine mucosa because of fetal death in the tube. The etiologic factors outside of the endometrium need not be discussed in connection with this hemorrhage except to say that the bleeding is slight, dark and irregular. The hemorrhage which occurs within the tube in ruptured ectopic pregnancy is the most grave of all hemorrhages occurring in the early months. This is due to perforation of the tube wall and opening of large vessels by chorionic villi or by extrusion of the ovum into the pelvic cavity as in tubal abortion. In either case there is severe internal hemorrhage with attendant symptoms, collapse, rapid pulse, pallor, subnormal temperature, which of course demands immediate attention, operation and frequently transfusion.

The theories as to fetal death are: 1. Destruction of the fetus and formation of a foreign body. 2. Cessation of stimulation of the endometrium by the fetus, the alterations of this reflex bringing on abortion. 3. Destruction of the corpus luteum of pregnancy, thus depriving the uterus and ovum of this influence.

Missed abortion is described as that period from the point of fetal death to the time of extrusion of the product of conception. This introduces the matter of active hemorrhage and attempts, successful or not, toward emptying the uterus.

We are confronted with two types of aborting efforts, pathologic and traumatic, for convenience of description. In the former there is usually slight but continuous dark blood without typical uterine pain. The ectopic pregnancy belongs in this group up to the time of rupture. In traumatic abortion there is more often the bright red hemorrhage with definite labor contractions. The former is usually present in the first three months of pregnancy and is rather hopeless from the first. While it would seem at first that the contrary would be true, still this is reasonable when the pathology is considered that the satisfactory attachment and development of the fetus is impossible.

Traumatic abortion is much more hopeful of treatment if the uterus has not been entered. If entrance has occurred, abortion is almost inevitable. In either case a fair trial at arresting the process should be made by placing the patient in bed in care of a competent nurse and in favorable aseptic surroundings. Morphine in large doses should

be administered hypodermically and opium and belladonna by suppository. When it is evident that abortion is inevitable the uterus should be emptied in the most conservative manner and at the first opportunity, but under the most careful aseptic surroundings, preferably in an obstetrical hospital. The product of conception should always be examined microscopically.

The technic of emptying the uterus is of considerable importance. When it is evident that expulsion of the fetus is probable and cannot be arrested by narcotics, the bleeding should be allowed to continue until the ovum is separated spontaneously. The uterus should then be emptied, preferably by the carefully sterilized finger with rubber glove covering. When this is impossible the product of conception or secundines should be removed with sponge forceps. Except in the rarest conditions curettage of any character is contraindicated. The same should be said regarding vaginal and intrauterine packing. As a rule such treatment is unnecessary, since rest, opium, pituitrin and ergot will usually control the hemorrhage. On the other hand, the risk of introducing packing in inevitable cases is attended with considerable danger of sepsis and as it is usually followed later by operative emptying of the uterus, it is therefore ill advised.

While the treatment of the bleeding is important for life and health, still the essential treatment of abortion and miscarriage is not obstetrical, but gynecological. The important treatment so far as the potential mortality and morbidity of early hemorrhage is concerned, is that which the patient should receive in the nonpregnant period. This may be outlined as follows: First, thorough investigation of the cause of disability after miscarriage, second, systematic correlation of the points learned by history and examination, third, appropriate treatment for systemic disease of acute or chronic nature, fourth, correction of all mechanical defects as lacerated pelvic floor and cervix, replacement of the uterus, removal of all foci and correction of all processes of inflammation, fifth, treatment of the endometrium by improving its circulation by the measures just mentioned. The sterilization of the uterine mucosa with iodine and cauterization of the cervix with iodine or the actual cautery should also be done.

Should these patients be subjected to routine curettage? Probably no greater surgical insult has been inflicted upon a larger class of patients than the women who have received routine curettage. The cure of the difficulties causing early bleeding cannot be brought about by scraping away the endometrium, but undoubtedly considerable harm is caused by increasing the already present irritation of the glandular areas in the uterine mucosa. Much more satisfactory results are brought about by directing our attention to the correction of systemic disease and definite local pathology.

Case Reports

COINCIDENT RUPTURED ECTOPIC GESTATION AND ACUTE SUPPURATIVE APPENDICITIS*

By Charles E. Ruth, M.D., F.A.C.S., Des Moines, Iowa

Cases such as this are rare enough to be well worth reporting, presenting difficulties too, in diagnosis, which makes them interesting. In over thirty years of dealing with these conditions I have never before seen them occur coincidently, so consider myself fortunate in making the diagnosis before operation.

The patient, Mrs. S., twenty-three years old, family history negative and general health good. She aborted in the summer of 1920, but recovered without incident. In October she menstruated normally but failed to menstruate at all in November. On December 7, she had an apparent attack of appendicitis accompanied by a slight menstrual flow, from which she recovered sufficiently to be about and at her work in three days.

Jan. 8 she was again taken suddenly ill. Her family physician, Dr. R. Fred Throckmorton, was called at two in the morning. She was in profound shock, pale, nearly pulseless, abdomen tender, rigid and distended with gas. Ordered to the hospital immediately, she did not arrive until late afternoon.

At ten in the evening of the same day her pulse, still weak, was markedly improved. She was no longer in severe shock. At this time her temperature was 101° F. Leucocytes 17,000. Pain, still severe, was more marked on the right side, as were also tenderness on pressure and muscular rigidity. Behind the uterus a mass filled the pelvic cavity.

Presumptive diagnosis of ruptured tubal pregnancy and acute appendicitis was made. Operation was postponed until morning, improvement from the shock seeming to indicate that hemorrhage had ceased and that further improvement was likely. Improvement did continue during the night so that she reached the operating room at eight o'clock in very fair condition.

Median incision below the umbilicus revealed the upper abdomen filled with pus, the lower abdomen and pelvis containing a large amount of partly coagulated blood. The right fallopian tube was found to be ruptured. It contained a placenta with attached cord and a three inch fetus. The tube was ligated, removed, and the stump covered with peritoneum. The pus in the upper abdomen came from a retrocecal appendix which was covered with a thin film of exudate. There seemed to be no attempt at limitation of the infection by adhesions of omentum or intestinal loops. The stump of the appendix was too thick and brittle to be ligated, but was inverted by suture. One large drainage tube was placed in the culdesac of Douglas and another behind the cecum.

The operation was concluded with as great speed and little exposure and trauma of tissue as possible. Postoperative condition fair. The patient was kept in a sitting position well inclined to the right. Proctoclysis was continuous. The wicking in the drainage tubes was removed at the end of twenty-four hours.

*Presented at the Thirty-Fourth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, St. Louis, Mo., September 20-22, 1921.

Recovery was complete in four weeks at which time she was up and feeling well.

It is not always easy to decide in cases such as this, whether to operate immediately or wait until conditions are a little more favorable. I do not like to operate at night. I feel that I do better work in the day time. Except in cases where it is quite apparent that the progress of the case is backward and delay dangerous, I prefer to wait until morning.

In this case we did the proper thing for she rallied from the shock and came to the operation in better shape than she would have the night before. And yet there was always the possibility that hemorrhage would recur or that she might have by morning absorbed enough of the toxins from the appendix to be beyond help. The latter danger we decreased by keeping her on her right side with the shoulders elevated, throughout the night. The danger from hemorrhage was lessened by limiting her movements with morphine and placing of an ice pack on the lower abdomen. The constant improvement during the night was not an absolute indication that we were safe. A hemorrhage might have occurred at any moment.

Twenty years ago suppurating appendicitis with diffuse peritonitis resulted in a mortality of about 90 per cent. Now 10 per cent is not expected, other complicating factors, such as we had in the case reported, being absent. The principal factors in reducing the former great mortality are, I think, five: (1) shorter time of operation; (2) continuous proctoclysis to supply the needed body fluid while the stomach is irritable; (3) Fowler position to aid drainage and prevent infection from gaining contact with the open mouthed lymphatics of the upper abdomen; (4) less trauma from atmospheric exposure, manual manipulation and contact of peritoneal surfaces with dry gauze; and (5) well placed, large drains.

415 Iowa Building. (*For discussion see p. 534.*)

DOUBLE UTERUS AND VAGINA*

By David Hadden, M.D., F.A.C.S., Oakland, California

In December, 1919, Miss E. S., nineteen years old, consulted me because of indigestion and loss of weight following influenza. Her last menstrual period had occurred in May, though prior to that time she had menstruated regularly every 20 days since the beginning of her menstrual life at thirteen years. The only symptom referable to the pelvis was a heaviness in the lower abdomen.

External pelvic examination showed a normal introitus. On digital examination it was found that a cystic mass bulged from the right side into the vaginal canal. It began one inch from the hymen and extended to the right of the cervix and above its level. It was of sufficient size and tension to make examination of the cervix and uterus difficult. The uterus appeared to be of normal size; the cervix was normal but congested. The cystic mass was not tender.

A diagnosis of a probable cyst of the duct of Gärtner was made because of the normal outlet and the level at which the cyst had its origin.

Following a few local treatments and organotherapy, the menstrual function was established and continued regularly without distress of any kind.

In November of 1920 the girl was married. About Dec. 25, I was called to her home to find her suffering with acute peritoneal irritation and presenting the picture of pelvic abscess.

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*Presented at the Thirty-Fourth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, St. Louis, Mo., September 20-22, 1921.

Drainage of the culdesac, Dec. 28, produced large quantities of decomposed blood, and an opening into the cystic mass through the drainage incision, produced the same material. A diagnosis of double vagina and uterus with blind vaginal canal on the right side was made.

On Jan. 10, the acute symptoms having subsided, I did a laparotomy. The uterus was double, but the right side was connected at the internal os with the left, though the cervices and vaginae were independent. The right uterus was smaller. The tubes and ovaries were normal. The appendix was congested.

I removed the right uterus and tube and carefully closed the opening into the left uterus. I then made a permanent opening into the right vagina from below so as to care for any vaginal secretion, as a removal of that structure seemed inadvisable and unnecessary.

The woman has been normal since the operation and at the time of writing is probably six weeks' pregnant.

HERNIA OF THE ILEUM THROUGH A RENT IN THE MESENTERY

By F. H. Jackson, M.D., F.A.C.S., Houlton, Maine

UNDER the above title Darnall describes a case occurring in his practice.* He is able to find only one similar reported case in the literature and comments upon the rarity of the condition. Darnall's case was a woman of 46 who was operated upon by him for an uncomplicated uterine fibroid. The procedure employed was a supravaginal hysterectomy from which the patient made a prompt recovery. A month following her first operation she was taken with severe abdominal pain in the epigastrium accompanied by profuse vomiting. Twenty-four hours later the condition of the patient was much worse. Despite the fact that enemata brought away gas and feces a diagnosis of ileus was made and operation performed. The operative findings were as follows: Through an opening in the mesentery of the second convolution of the ileum there had slipped a loop of ileum belonging to the first convolution high up on the left under the spleen. The loop had undergone a twist, was gangrenous and perforated. In the left kidney pouch was an abscess and foci of pus in various locations in the upper abdomen. The whole abdominal cavity was filled with fluid and intestinal contents. A resection of the ileum by means of the Murphy button and drainage was employed. The patient died from shock five hours following operation. Commenting upon the pelvic findings Darnall states that there were no constricting bands or adhesions.

The following case came under observation in February, 1921, and while the hernia was through a rent in the mesentery it was situated in a different location. It is obvious that an exact diagnosis is impossible as to the cause of the obstruction in such a form of ileus. The fact that such a thing can and has occurred is worth bearing in mind when confronted with a patient presenting the more or less complete syndrome of a mechanical ileus.

L. W., age sixty-eight, F. M., was seen on February 21, 1921. Twenty years ago she had a complete supravaginal hysterectomy performed for a very large uterine fibroid complicated by very extensive adhesions. She informed me that the operation was a prolonged one, that the attending surgeon told her that her bladder was torn during the removal of the fibroid mass so that drainage was employed

*Wm. Edgar Darnall, Amer. Jour. Obst. and Gynec., 1921, i, No. 4.

and her recovery was tedious and prolonged. While able to live a fairly active life following her first operation, there has always been more or less abdominal pain. She had attacks of pain and distention which were overcome by enemata and catharties. There has also been quite marked dysuria and frequency. She went on until sometime in the summer of 1920 when she had a very severe attack of general abdominal pain, accompanied by marked distention and vomiting. Relief was obtained by hot packs and enemata. Following this attack she claims never to have been entirely free from some abdominal discomfort but that it was very much less if she had a daily bowel movement. The attacks, however, became more frequent and increased in severity. On January 18th, 1921, the gall bladder was removed. She says that her symptoms immediately previous to the cholecystectomy were no different than in any of the previous attacks. A few days later she was seized with excruciating abdominal pain, accompanied by nausea, profuse vomiting, and distention. Her condition became critical, but relief was finally obtained after massive continuous hot packs to the abdomen and from enemata. A consultant who saw her during this attack stated that a diagnosis of ileus was made by him and that by rectal and vaginal examination he was able to make out a distinct mass in the pelvis. Following the relief of the very acute stage of her illness he was able to still make out the exquisitely tender mass in the same location.

The patient came under my care on the 21st of February and I was able to confirm the then attending physician's opinion. Operation was done on February 22, 1921. A median incision was made dissecting out the line of her previous lower abdominal incision. There was a bewildering mass of adherent intestines in the pelvis and a loop of ileum was found firmly adherent to the bladder. Even through the adherent intestines it was quite easy to make out the mass that was felt before operation. This was a loop of ileum of some ten inches in length that had slipped through a rent in the mesentery of the ileum in its lower part. The loop was partially twisted clockwise and was very adherent to the sigmoid. The rent in the ileum was an old one inasmuch as its surface was perfectly smooth. The ileum was removed from the bladder, the incarcerated loop released from the pelvis and the rent in the mesentery repaired. No attempt was made to interfere with the other adhesions as the condition of the patient was such that time was a marked factor in the case. Following the operation she had quite marked abdominal distention for a number of days but the response to massive hot packs and enemata was very gratifying. She was in the hospital about three weeks. When last seen (November, 1921,) the frequency and dysuria were quite bothersome but otherwise she was in very good condition.

FOUR CESAREAN OPERATIONS ON ONE PATIENT

By Herbert Thoms, M.D., F.A.C.S., New Haven, Conn.

THE following report is interesting for two reasons: first, because of its bearing upon the question of the uterine scar, and, second, because of the performance of cesarean section for the fourth time upon the same patient.

Mrs. H. C., age twenty-seven, colored, admitted to the Obstetrical Service, Grace Hospital, Nov. 6, 1921. Patient had measles, mumps, pertussis and pneumonia as a child. History otherwise negative. Menstruation began at fourteen, always regular, 28-30 days, duration 4 days, moderate flow, no pain. Menstruated once or twice since last baby, does not know when, or when present pregnancy started. Thinks date of confinement is in early January.

Married four years, husband in good health, except for attacks of rheumatism. Two children alive and well, one child died of pneumonia at nine months. All pregnancies normal throughout, no history of vomiting, toxemia, etc.

First labor, May, 1918, delivered by cesarean section after 72 hours labor, in Waterbury Hospital, Waterbury, Conn. Baby 8¼ pounds. Convalescence normal.

Second labor, May, 1919, delivered by cesarean section after a trial of labor at St. Raphael's Hospital, New Haven. Baby 9½ pounds. Convalescence normal.

Third labor, Dec. 4, 1920. Entered Grace Hospital, New Haven at 8:30 P.M., membranes ruptured spontaneously shortly after admittance. At the time of her entrance she was having good contractions every three minutes and was seen at this time by Dr. T. V. Hynes, who ordered her prepared for immediate section. Operation was performed at this time by Dr. Hynes and myself. Upon opening the abdomen through a median incision the omentum was found densely adherent to the parietal peritoneum and anterior uterine wall and it was with considerable difficulty that the old uterine scar was exposed and the adhesions freed. Upon opening the uterine cavity the edge of the placenta protruded through the open wound, apparently having been implanted for a part at least over the uterine scar. This organ was pushed to one side and a live male child of 8½ pounds extracted. The uterus and abdomen were closed in the usual manner without drainage. The convalescence was normal and mother and child left the hospital in good condition 15 days after entrance. A Wassermann taken at this time was negative.

On October 25, 1921, the patient presented herself at the Prenatal Clinic of the Grace Hospital Dispensary. At that time the fundus was 8 cm. above the umbilicus. Abdomen showed old scar in midline about 15 cm. in length. No hernia, apparently well healed. The fetal and maternal hearts were normal. Urine negative. The measurements taken at this time were: spines, 22, crests 24.50, trochanters 29.00, extern. conj. 17.25.

On November 6, 1921, the patient was admitted to the Obstetrical Service having uterine contractions accompanied by some bloody discharge from the vagina. One hour after entrance she was seen by me and at this time it was apparent that labor had definitely started. Rectal examination revealed the cervix to be 4 cm. dilated and the membranes bulging. She was removed to the operating room and prepared for immediate operation. On incising the abdomen many adhesions were found as at previous operation, involving the peritoneum, omentum, intestine, and anterior surface of the uterus. These were freed and incision in uterus made in the midline. At the inception of this cut a large portion of the placenta protruded through the incision and it was evident that this organ was implanted upon

the old scar. The uterine wall at this point was abnormally thin, not more than a millimeter or two in thickness, and it was apparent that labor could not have progressed much further without great danger of uterine rupture. The placenta was pushed to one side and a small live female baby delivered. The placenta and membranes were removed manually. The uterus contracted exceptionally well immediately and was closed in the usual manner. The patient was sterilized by the resection of a portion of both tubes and by the excision of a small wedge at each uterine cornu containing the uterine portion of each tube. The abdomen was closed without drainage in the usual manner. The convalescence of both mother and child was quite normal.

Comment.—The extreme thinness of the uterine wall at the site of the previous scar may have been due to (a) excavation due to poor union at previous operation, (b) thinning out due to intrauterine pressure at the time of labor, (c) syncytial erosion. It seems reasonable to suppose that all three processes may have shared in the condition.

Recent researches have taught us that the uterine wall underneath the placenta, even in normal pregnancy with normal implantation, is thinner at this point. It is also reasonable to suppose that the burrowing and penetrating properties of trophoblastic tissue and chorionic villi may invade the scar formation and thus weaken it. This is probably particularly true in instances such as the above where pregnancy has followed operation in such a short time. The history of this case well emphasizes the fact that the cesareanized woman needs extra medical supervision and during the last month of pregnancy such supervision should be constant. Because the puerperium following cesarean section is unattended by fever or other manifestations of infection, is it not assuming too much to claim that the scar in such instances is perfectly healed and will stand an equal amount of strain with any other portion of the uterine wall? The knowledge of the implantation of the placenta and of the condition of the scar would greatly strengthen our position in regard to our treatment of the cesareanized woman.

59 COLLEGE STREET.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS. THIRTY-FOURTH ANNUAL MEETING HELD AT ST. LOUIS, MO., SEPTEMBER 20, 21, AND 22, 1921

(*Continued from the April issue.*)

DR. JAMES E. DAVIS, of Detroit, Mich., read a paper entitled **Neoplasia of the Kidney with Reports of Five Primary Cases.** (For original article see page 478.)

DISCUSSION

DR. GEORGE GELLHORN, ST. LOUIS, MISSOURI.—It seems a far cry between the adrenals and gynecology and yet, several years ago I published a case which shows that there may be a close connection between the two. The patient, a woman of sixty-four, was admitted to the hospital because of symptoms of mental confusion. She seemed to have pain in the left side of the abdomen, and on examination a large retroperitoneal tumor of obscure origin was found in that side. The next day when the nurse reported a suspicious vaginal discharge I was asked to examine the patient and found in the anterior vaginal wall just below the urethral swelling two small tumors the size and color of red raspberries, which could easily be shelled out with the finger nail. These were removed and when I examined them microscopically, I found adrenal structure. The large tumor, then, was diagnosed a hydronephroma. A few days later the woman died and on autopsy this diagnosis was confirmed.

Such vaginal metastases seem to be rather rare, because on careful search only nine other cases could be found in the literature. Whereas hydronephroma metastasizes quickly and extensively in other parts of the body, the genital system seems to be very rarely involved. However, I have a suspicion that many of the so-called primary sarcomata of the vagina, particularly in children, are in reality, secondary to undiscovered hydronephroma higher up. It might be wise, in the future, to think of the possibility of hydronephroma if one encounters such a vaginal tumor.

DR. DAVIS, (closing).—I desire to emphasize the age incidence of my cases. The first was fifty-one years of age, a female; the second was a patient fifty-six years of age, a female; the third was sixty years of age, a female; case four was a patient sixty-two years of age, a female; and case five, aged seven months, was a male.

DR. THOMAS B. NOBLE, of Indianapolis, Ind., presented a paper entitled **Transperitoneal Nephropexy.** (For original article see page 493.)

DISCUSSION

DR. ROLAND E. SKEEL, LOS ANGELES, CALIF.—In the discussion on radium yesterday the essayist observed that we were discussing something which would be

obsolete in a few years; but he now has given us the technic of an operation which so rarely ought to be performed that it should have been obsolete for the past ten or fifteen years. Leaving aside the few patients with recurrent or persistent hydronephrosis, which we consider to be definitely surgical, why do a nephropexy on anyone?

Quadrupeds do not have movable or floating kidneys, but bipeds do; and the most beautiful illustration of useless surgery is that employed to fix a kidney in which the principal symptom is pain without evidence of retention of urine in the kidney pelvis. These patients are all physically inadequate and consequently neurasthenic and if one relieves the patient from a pain in one side, she develops pain in the other or in the back of her neck or elsewhere. Moreover, if consistent with life you might remove all the organs in the abdomen and the patient would still complain because the origin of her symptoms is in the central nervous system.

DR. K. ISADORE SANES, PITTSBURGH, PA.—Pyelography has demonstrated to us cases of prolapsed kidney that are pathological. We have seen cases of nephroptosis with such kinks and angulations, at times fixed by adhesions, that the flow of urine was greatly interfered with, causing a hydronephrosis and pyonephrosis. There is no question that there are cases which require surgical interference.

As to the operation suggested by the essayist, if I were to operate primarily for nephroptosis I would unquestionably choose the posterior route, but if, during an abdominal operation, with a sufficiently large incision, I had to do a nephropexy in addition, I think I would consider favorably the operation suggested by the author.

DR. C. W. MOOTS, TOLEDO, OHIO.—I would like to go a step further than Dr. Skeel and say that we should never operate for pain *per se*.

DR. MILES F. PORTER, FORT WAYNE, INDIANA.—"Never" and "always" are very strong words. Never operate for pain? God forbid that I should ever find it necessary to consult that surgeon with a neuritis of the fifth nerve! Yes, we operate for pain!

DR. NOBLE, (closing).—The matter of displaced kidney is one that men have debated for years, as well as other visceroptoses, and because of the failure in many cases, discouragement has come to many, and certain operators have therefore quit working on the kidneys and allowed the patients to go on and suffer pain. They have approached the kidney through the back; which I believe is the wrong route.

Clinical progress and conversation with your confreres prove the statement that I make. This very day one of our Fellows told me of an experience which I am privileged to quote. Recently a patient was operated through the back for a floating kidney, followed by recurrence. Again operated in the back, and again followed by recurrence. This confrere then took the case, operated once more through the back, and again, recurrence. Then he operated through the abdomen to take the kidney out and found the patient had a pathological gall bladder to be taken care of. Another reason why we should go into the abdomen; we may find something else and thus make our patient well.

A few days ago, I saw a woman who had been cut in the back, with urinary drainage for months and months. There was a picture of renal stones in that kidney. She had been cut in the back but the renal fistulae continued and a subsequent picture showed a plugging of the ureter from another stone. I found her with a discouraged operator, and stone on the other side. She was turned over to me. But I said: if I do it I will do it my way. I will save the right kidney, if possible, and do with the left what I have to do. With a cut in front I found out (she was

a fat woman and we could not make this discovery before) that she had a big, thick gall bladder plugged up with a stone exactly the size of the shadow on the right side. One would think at once, here is the solution of the trouble. I felt quite elated that I had gone in, for this was the pathological lesion. I removed the gall bladder and the stone. I was unable to palpate anything through the fat about her kidney and hoped I had removed the source of her trouble, but a photograph showed the same shadow. Four weeks later through the same incision, I removed the stone in the right kidney. She has yet to undergo a fourth operation for the trouble in the left side.

Among many of the cases, we find that to cure the patient we have to take care of the pyloric disease, of the accessory artery in the lower pole of the kidney, the head of the colon; we have to do with other pathology as well as that of the kidney, and through such an incision I maintain that I can do my patient more service than I can through the back.

Dr. Charles W. Moots, of Toledo, Ohio, read a paper entitled **The Ice Bag in Appendicitis,—A Fetich.**

This article appears in full in the current volume (1921), *of the Society's Transactions.*

DISCUSSION

FREDERICK S. WETHERELL, Syracuse, N. Y.—Dr. Moots makes the statement that the ice bag on the abdomen has no effect on the growth of organisms in the appendix. He also makes the statement that the chance for gangrene is increased by interference with the circulation. I would like to have him explain how the cold gets down through the skin, the superficial fascia and muscles to the appendiceal branch of the ileocecal artery so as to change the circulation, without having any effect on the organisms.

DR. A. J. RONGY, New York City, N. Y.—In a series of experiments in cases with abdominal fistulae where the temperature was measured with ice bags on the top of the abdomen they had no effect on the internal viscera. What the ice bag does is to stop the pain by acting on the nerves of the skin. It does not change the temperature at all, and it cannot do it within the abdominal cavity.

DR. MOOTS, (closing).—In reply to Dr. Wetherell, I believe we agree entirely. I think it was bad rhetoric that permitted you to get the impression you did. I had in mind, when I wrote the sentence, to say that it did not do that much.

For twenty-six years I have been asked by many medical associations to take an active interest in legislation to protect the public from the so-called nonmedical cults. The object in writing this paper was to bring forcibly before you this fact, —that until our trained men will go home and do as well as they know, we have no right to ask legislation to protect the public.

Dr. Benjamin R. McClellan, Xenia, O., reported two cases of **Torsion of Appendices Epiploicae.**

This article appears in full in the current volume (1921), *of the Society's Transactions.*

DR. A. J. RONGY AND DR. S. S. ROSENFELD, of New York, presented a paper entitled **Transuterine Insufflation, a Diagnostic Aid in Sterility.** (For original article see page 496.)

DISCUSSION

DR. JAMES E. KING, BUFFALO, N. Y.—There is no question of the value of this method in determining the patency of the tubes. Dr. Rongy has described the dangers which arise from this procedure, and I think it should be emphasized that this method should be used only by the gynecologist or some one competent to determine whether there is an existing infection. I have in mind a case where a very severe and almost fatal pelvic infection resulted from the use of this procedure. The case was in the hands of a general practitioner. The patient applied to him because of her seven years' sterility and he, having read an article on this procedure, got into communication with an x-ray man, with the result that they found that at least one tube was patent. One day later the patient had a slight pain. Two days later she had very severe pain. I was asked to see her at this time and found her with a very rapidly spreading pelvic peritonitis. After four weeks of very serious illness she improved and I found upon examination before she left the hospital that her pelvis was practically wrecked. Her uterus was firmly fixed and her chances for pregnancy are gone unless great absorption takes place.

DR. RONGY, (closing).—I never undertake the treatment of sterility unless the husband is examined and not only is the semen examined microscopically but we also try to determine how long the semen survives in the vaginal tract and we test it with many reagents in order to study their effects.

Dr. King is right—unless a man is sure of his pelvic pathology he should not undertake this work. One must ascertain by examination whether an infection exists in the pelvis. We never subject any woman to this examination when there is the slightest indication of any inflammation in or about the pelvis, which is of recent origin. It is in the clean cases that we use this method. To my mind this procedure is not only useful to determine the patency of the tubes but it also helps us to determine our procedure on the operating table.

The morning I left for St. Louis I operated on a woman who had a definite pathologic condition in the right tube, and while the woman was on the table and the abdomen open I made use of this method in order to determine whether the left tube was patent or not. Apparently the left tube seemed to be involved, but under pressure we succeeded in passing the gas through and therefore, left the tube in. I am sure that the gas introduced through the uterus under pressure will very often straighten kinks in the tubes and also expel the mucous plugs very often found in the outer portions of the tubes. We have often introduced the oxygen into the abdominal cavity under a pressure of 200 millimeters.

DR. BUDD VAN SWERINGEN, Fort Wayne, Ind., read a paper on **Anomalous Location of the Duodenojejunal Junction.**

This article appears in full in the current volume (1921), *of the Society's Transactions.*

DR. CHARLES E. RUTH, of Des Moines, Iowa, read a paper entitled **Coincident Ruptured Ectopic Gestation and Acute Suppurative Appendicitis.** (For original article see page 525.)

DISCUSSION

DR. STEPHEN E. TRACY, PHILADELPHIA, PENN.—Some years ago I saw a patient with a somewhat similar history, whom the family physician had treated for an acute attack of appendicitis. The patient had apparently recovered and the doctor had discharged himself. The following morning the patient was seized with violent abdominal pain. When the doctor arrived he found her in a state of collapse with marked tenderness over all the abdomen. She was sent to the hospital and the resident physician reported, that from the history, he thought she had a ruptured ectopic gestation. When I saw her later in the morning she had reacted and was in a fair condition, and an immediate operation was decided upon. The pelvis and lower abdomen contained a considerable quantity of liquid and clotted blood from a ruptured left tubal gestation. The appendix was retrocecal, acutely inflamed and filled with pus. The left fallopian tube and the appendix were removed and the patient had a normal convalescence.

DR. DAVID HADDEN, of Oakland, Calif., presented a paper entitled **Double Uterus and Vagina.** (For original article see page 526).

THE NEW YORK OBSTETRICAL SOCIETY

MEETING OF JANUARY 10, 1922.

DR. RALPH H. POMEROY IN THE CHAIR

DR. ELIOT BISHOP presented a report of two cases of **Myoma Causing Dysmenorrhea Cured by Operation.**

While fibromyomata are frequently operated on for other reasons, it is not common to find small ones causing dysmenorrhea, with operative cure demonstrating the etiologic relationship; so for this reason, I am briefly reporting the two following cases.

The first, a fourteen-year-old schoolgirl, whose family history, and past history are unimportant, except that she has never looked well-nourished. Her first period came in July, 1919, accompanied by severe emesis and syncope, but no pain. In September, pain began, and she had a heavy flow. Since then it has been a normal amount, but very painful, and during its duration of five to six days, she always vomits, and there is slight clotting toward the end of the flow. The pain is in the right iliac region, lancinating, paroxysmal and accompanied by right-sided backache. She is confined to bed during this time and has marked eructations. When seen first in June, 1920, she was not a particularly well-nourished girl, her heart and lungs were negative, with large tonsils whose removal had been advised, and in July, 1920, was done. There were no spinal lesions to account for the backache. Abdominal examination showed tenderness over the right kidney, and McBurney's point, and also deep in the right iliac region, but very slight on the left side, and no masses were demonstrable. Rectal examination showed a uterus normal in size, and position, and a mass in the right side five by four cm. which was presumed to be a cystic prolapsed right ovary, and operation was ad-

vised. However, it was postponed until the fall, and during the summer she had practically no dysmenorrhea, but had some attacks of vomiting, with right-sided pains, usually coming after a period. In one of these attacks, on November 3rd, I was called and she seemed so sick that a diagnosis of a twist of the pedicle of a cystic ovary was made, and she went to the hospital for observation. At the Brooklyn Hospital, on November 5, 1921, she had a temperature of 99.6° F. and a pulse of 100. Her urine was negative, a blood count showed 17,400 white cells, with 89 per cent polynuclears. A second count was done three hours later, which showed 19,800, with 98 per cent polynuclears. The patient looked sick. She was put in the knee-chest position for ten minutes in hope of untwisting a pedicle. After that she had an enema and received sixty grains of bromide by rectum, and a gastric lavage. Vomiting finally ceased, during the night, and after two days, as she had no fever, and the white cell count dropped to 9,400 with 60 per cent polynuclears, operation was decided upon, and the abdomen was opened on November 8, 1920. The mass felt by rectum was found to be intimately connected with the uterus, and a diagnosis of myoma was made. The right ovary was 1½ inches long and cystic; the right tube was occluded or obliterated for ¾ of an inch. The right adnexae were removed after Norris' method. The myoma was shelled out, and during this procedure, about an ounce and a half of black blood broke through from the center; the usual myomectomy technic was followed. The left adnexae were apparently normal. A sharply kinked appendix was removed, and the abdomen was closed in layers. The pathological report was "fibromyomatous tumor with hemorrhagic degeneration," but there was no mucosa in the cavity, thus demonstrating that it was not a uterine anomaly. She was seen in January, 1921, and again in January, 1922, and she reports no dysmenorrhea, or any symptoms at the periods, local or general, and no pelvic symptoms at any other time. Rectal examination shows the uterus in normal position, and the fornices negative.

The second case was a twenty-eight-year-old woman, who had had a hard labor with a stillbirth in 1914, with no other pregnancies. In 1916 her cervix was repaired at the Brooklyn Hospital, and since then she has had elsewhere, seven dilatations and curettements for her present trouble, and in 1919 she had her left ovary and appendix removed at the Norwegian Hospital. Her periods, which began at sixteen are regular and moderate, and until 1916 only moderately painful. She was first seen in May, 1921, complaining of pain in the left side for five years past, extending into the back, coming usually after, but occasionally with the periods; sometimes it would seem to be associated with alternating periods. The pain was unusually severe, and squeezing in character, and always accompanied by nausea. She showed a good pelvic floor, and the fundus was of good size and position, and, aside from resistance in the left fornix, the pelvis seemed to be negative. She was admitted on May 10 to the Brooklyn Hospital, for study, with a provisional diagnosis of varicosities of the broad ligament. The heart and lungs were negative, as was the urine; she had no fever, and her blood pressure was normal, the blood picture was also normal, and cystoscopy and pyelography demonstrated no lesion in the bladder, left ureter or kidney. The pelvic findings were so slight that consultation was requested and with the story of such prostration and onesided pain, exploration, was advised, and on May 14, the abdomen was opened. There was a difficult dissection through the old scar, but no intraperitoneal adhesions were found that needed freeing. The right adnexa showed a large, but free ovary, and an apparently normal tube. The left side showed that about one inch of the tube had been left, and was covered by an adhesion. About three quarters of an inch of the left tuboovarian ligament was found, and at the end there was possibly a slight portion of the left ovary. Just below the attachment of the left round ligament was found a fibromyoma, 2 by 1 cm. in the body of the uterus. The left

side of the uterus and broad ligament was resected and peritonealized, and the abdomen closed in layers. We got no histological report on this tissue. The patient made an uneventful convalescence. She was seen a month after the operation, and had had one period, which was profuse and clotted, but painless. Examination showed slight tenderness, and a mass in the left, which was presumed to be an exudate. She was seen again, July 6th, having had a period June 15-22, premature, but painless, and examination showed a negative left fornix. She was seen in January, 1922, and reported that she has had no pain at any period since her operation, and examination showed her uterus in good position, and the left fornix was negative, and the right fornix showed apparently normal adnexa.

In the last few years, with more intensive case study, gynecological surgery has become more satisfactory in results, with the exception of surgery for dysmenorrhea, and the excellent result in these two cases gives me the excuse of reporting them. The first had a clear cut indication, but the lack of signs in the second shows us that we sometimes must take the chance of thorough exploration of the pelvis, even in a young woman.

DISCUSSION

DR. J. V. D. YOUNG.—I would like to report the case of a woman thirty-one years old, who was married and had borne no children. She came to me in June, 1920, with very severe dysmenorrhea of the character that Dr. Bishop has described, severe mental depression, and very pronounced backache. These symptoms had lasted ten years without relief. She had had no operation. She had a fibroid about 3 centimeters in diameter, which was felt in the left fornix. I advised removal of this fibroid, which was done by me in November, 1920. It was located in the uterine wall. Since its removal she has remained absolutely free from dysmenorrhea.

DR. OTTO H. SCHWARZ, St. Louis, Mo., presented (by invitation) a paper entitled **Diffuse Adenomyoma of the Uterus: Conditions Influencing Its Development.** (For original article see page 457.)

DISCUSSION

DR. W. P. HEALY.—Adenomyoma is a comparatively rare lesion in our experience. In five years up to January 1, 1920, we had only 14 cases of the diffuse type in the Roosevelt Hospital service. We had a number of ectopic adenomyomata occurring in other places, but of the diffuse type we had 14, and these three conditions to which our attention has been drawn as being associated with it, are quite common lesions in the uterus; that is, myomata, chronic metritis and hypertrophy. It would seem to me that if we were to assume that they are an underlying cause for the development of adenoma or adenomatous changes passing out into the corpus uteri from the endometrium, that we would meet with the lesion more frequently.

DR. J. O. POLAK.—The first thing that impresses one, in looking at the slides which were shown, is that adenomyoma is a distinct entity which has nothing whatsoever to do with the myomatous uterus. The second point which the doctor has brought out, and which is a point I think he makes clear, is the fact that the normal uterus is not subject to these invasions from the mucosa.

While the diffuse adenomyomata which the doctor describes and the cases he

reports are relatively few, I feel certain that were we to make serial sections of our cases we would find them more frequently than we do. It has been surprising to find that where this has been done in cases which did not show definite evidence grossly of such lesions, microscopically the lesion was found.

Now, all adenomyomata do not occur as diffuse tumors. The class to which the doctor has called attention is easily explained by the invasion theory which was suggested by Cullen and which the doctor has shown so clearly in these cases of metritis, of subinvolution and of hypertrophy, where the fibers are actually spread and the uterus is relaxed to a greater or lesser extent. Again, we know that this invasion takes place along the blood vessels, particularly in cases associated with inflammatory lesions, and while it does not invade the blood vessels, you will find that these invasions of the mucosa and these causal rests are present in the blood-vessels. But there are several adenomyomas that are not explained, those of the rectogenital space, which Cullen has attempted to explain by an inversion of the peritoneum and that the peritoneal covering can take on the same characteristics as the cells lining the interior of the uterus. It seems at first hand that that is a rather improbable theory and still it is a fact that the large majority of the myomata which I have seen have been located in this region. The next most frequent location, in my experience, is at the cornu of the uterus, usually posterior; and whether the old theory that the wolffian duct and the müllerian (duct) crossing at that point, causing relaxation, has been the etiologic factor of the development (of the condition) at that point, or whether it is purely inflammatory and the result of an invasion and inclusion of the mucosa, as one expects to find at that point in chronic inflammations of the tubes, is the etiologic factor, it is difficult to say. Yet those are two very common locations in which we find adenomyomata. How can we explain on this invasion theory the adenomyomata that we find, for example, in the round ligament, in the broad ligament, and in a case that Dr. Pomeroy reported and one I reported of the umbilicus? It is hard to think of the invasion of the mucosa to such points as that.

This paper has been very illuminating, because, first, it has brought out so clearly that a healthy uterus seems to be protected; secondly, it is a distinct entity from fibroid of the uterus; and, thirdly, there is a relaxation, so to speak, and a broadening of the muscle fibers which allows of invasion of these mucosa rests.

DR. HERMANN GRAD.—In a study of a series of 100 uteri to find the cause of bleeding, I found that in only 3 of the cases had the pathologist reported penetrating uterine glands, and that was the only lesion that we found to account in some way for this bleeding, and in all there was this marked condition of subinvolution. In one of the 3 cases, in addition to the subinvolution, there was also what the pathologist, Dr. Strong called a myometritis.

DR. S. H. GEIST.—I have had the opportunity of looking at a great many uteri in the last ten or twelve years and have been struck with the comparative rarity of this condition. At Mount Sinai Hospital, where we have a fairly large service, we see not more than 6 to 10 cases of diffuse adenomyoma cases a year. We see more frequently adenomyoma, a distinct tumor, in which there are islands of uterine mucosa.

It is not my recollection that the lesions which Dr. Schwarz describes are always present. We have diffuse adenomyomata without any type of lesion, either fibroid, hypertrophy or the condition which he describes as subinvolution. The hypertrophied condition of the mucosa, I believe, is an entirely different problem. That is a condition which we find associated, as the doctor has stated, with fibroids, and particularly with the types of cases that are called "essential bleeding." I

believe that the lesion in the mucosa has nothing to do with the process in the uterus, and that it is probably an expression of some other factor. However, I think that there is undoubtedly a great deal to be said in favor of the invasional theory, in view of the fact that in the presence of chronic irritation, whether because of subinvolution or the rare finding of a chronic metritis there is a stimulus to the normal uterine mucosa which has no submucosa to protect the uterine wall and allows this so-called invasion. I think invasion is a badly chosen term because it gives one the impression of a malignant tumor, and these conditions of adenomyomatosis are not malignant; they are benign and simply give rise to the local symptoms which we deal with in these cases.

I think that in the presence of an inflammatory process or some other irritative factor, we might have one possible etiology for the infiltration of the so-called normal mucosa into muscularis or fibrous tissue wall of the uterus.

DR. H. B. MATTHEWS.—It seems to me that this invasion of the endometrium might be looked upon as the precursor, as it were, of cancer. It seems strange that this tissue can migrate out of its normal habitat into the interstices of this muscle tissue without finally acquiring some characteristics of malignancy.

DR. W. S. STONE.—Apropos of the remarks of the last speaker regarding the development of cancer in such a tumor, I have seen two cases of uterine cancer in which such a sequence of lesions seemed probable. Both of them were operated upon under the diagnosis of fibromyoma with the probable complication of some tubal disease. At operation, in both cases, the uterine tumors were found densely adherent to all the surrounding structures and the removal of the tumor was extremely difficult. Instead of an inflammatory cause for these adhesions we found a diffuse infiltration of the uterine wall with a malignant neoplasm which extended directly to the peritoneal surface and perimetrial structures, differing in its mode of distribution entirely from that which we see in the ordinary adenocarcinoma of the uterine body, and illustrating nicely how the anatomy of cancer is determined by the type of lesion that has previously existed. In both of these instances it seemed most probable that the cancer had its origin in a diffuse adenomyoma. Its diffuse distribution and its extent was such that it could not be accounted for in any other way.

DR. R. L. DICKINSON.—The clinician would ask the writer of the paper to carry the study further, if his histories admit, to tie his pathology to his symptomatology and treatment, whether the pain, the dysmenorrhea, the intermenstrual pain, the bleeding can be grouped as definitely with his pathology, so that we can fit our treatment to them.

DR. OTTO H. SCHWARZ.—It appears from the discussion that others do not feel that the lesion is as frequent as I indicate. I think the frequency in which this lesion is found depends directly upon the interest one has in the specimen, whether it is the operator or the pathologist. It has been my experience that most general pathologists are not particularly interested in this special field, and a man who is particularly interested in this subject will give more accurate data as regards the frequency of this lesion.

Inflammation accompanying this lesion in my series was not at all striking; it was so slight that we made no table of the cases in which this lesion occurred. However, in the case of cornual or tubal lesions, inflammation is present in almost every instance.

The term "invasion" was used in this paper in a mechanical sense, merely a flowing in of the endometrium between the muscle bundles, and in no sense invasive as compared to the invasion of a malignant growth.

As subinvolution is very frequently present in large uteri removed at operation, one might also ask the question, "If this condition has anything to do with the causation of adenomyoma, why do we not find it more frequently?" I feel that this might be explained by the fact that frequently in subinvoluted uteri we have an endometrium which is rather atrophic and it might be expected that such an endometrium would have less tendency to invade these clefts than a normal or more active endometrium might have.

In regard to the clinical aspect considerable data are embodied in the paper which I neglected to mention. In our series there were only six nulliparous uteri; in Cullen's series there were fifteen.

Menorrhagia was found most frequently in those cases with hyperplasia of the endometrium, which occurred in about twenty-six cases of my series. In every instance where hyperplasia was very definite the menorrhagia was quite profuse. This was also true of the cases of hyperplasia in Cullen's series. In the cases of subinvolution in my series only one-half gave a history of increased bleeding. In the cases of myoma alone, both nulliparous and multiparous, there was no hemorrhage in several.

OBSTETRICAL SOCIETY OF PHILADELPHIA

STATED MEETING NOVEMBER 3, 1921

THE PRESIDENT, DR. JOHN A. MCGLINN, IN THE CHAIR

DR. AUGUSTUS KORNDOERFFER read (by invitation) a paper entitled

Further Experiences with Pituitary Extracts in Obstetrics.

After enumerating the clinical indications for the employment of pituitary preparations, Dr. Korndoerffer stated that an exhaustive search of the literature failed to disclose any references to the use of this substance for the control of after-pains. Without attempting to enter into a prolonged discussion of the etiology of this condition, Dr. Korndoerffer stated his belief that an altered endocrine function or disturbance existed as the basal cause of the same. He assumed that if ergot had a sphere of action in this condition, the pituitary preparations would possess a similar one and it is therefore logical to inquire whether any objection could be offered to the use of pituitrin for the control of after-pains. In his own experience a variety of remedies usually employed for this purpose had proved unsatisfactory or disappointing. Dr. Korndoerffer based his indications on a study of the physiological action of the drug obtained from the literature. A routine order was issued in the maternity department of the Children's Homeopathic Hospital of Philadelphia that all cases of after-pains be treated with pituitrin. It was given in one mg. doses and while some cases suffered a short temporary aggravation, all others were relieved. As for contraindications, Dr. Korndoerffer's experience included neither uncompensated heart lesions, threatened respiratory collapse, nor arteriosclerosis. It was also given in cases of high blood pressure without ill effects. In the latter case he based his indications on the statement made by Heaney, of Chicago, who showed that in healthy individuals there is no rise in blood pressure if the injection is made subcutaneously and that it only occurs if intramuscular or intravenous injections are employed. In cases of acute nephritis in pregnancy pituitrin was administered in 1 mg. doses without bad results. In no instance was any depression

noted. Convalescence seemed to be uninfluenced during the employment of the drug and the essayist concluded that pituitrin was a most useful and practically harmless means of relieving troublesome after-pains.

DISCUSSION

DR. WILLIAM E. PARKE.—I have never given pituitrin with the distinct purpose of controlling the after-pain. I have given it for bleeding and, so far as I know, the nurse has given it practically always intramuscularly and not subcutaneously. The occasions on which I would give it would be after long, tedious labors when I feared postpartum hemorrhage, or when there was actually an excessive amount of bleeding without a distinct hemorrhage. I have not thought of it along this line enough to know whether it was a factor in controlling after-pains in these particular instances.

DR. DANIEL LONGAKER.—With reference to the use of pituitrin after delivery, during the last six months it has been my practice routinely to administer 1 c.c. of pituitrin intramuscularly immediately on the delivery of the baby. I do believe in the speaker's contention that there has been less after-pain than when not given.

DR. LIDA STEWART COGILL.—I would like to ask Dr. Korndoerffer how he explains the action of pituitrin in relieving the pain. He spoke of the pituitrin producing muscle contraction and yet not being followed by any expulsion of clots, of its making the uterus firm and causing involution to go on much more rapidly. In the Maternity at the Woman's Hospital, we have not used pituitrin for after-pains. In fact we have very few of our multiparae complaining of after-pain where we are sure the uterus is kept free of clots. We are using less and less after-pain medication of any kind.

DR. J. E. JAMES.—I think one can readily agree upon the dearth of material relative to any accurate data or consideration upon the subject of after-pains, which necessarily, therefore, makes the present consideration of the subject a most important one. Patients oftentimes will complain more bitterly of after-pains than of the actual suffering during the course of labor. I think we can all readily agree, likewise, that the usual agents recommended, namely, ergot and opium, prove failures in the constant control of this most annoying condition of the puerperium. In my own clinic we have been using pituitrin for the past year or two in place of the different preparations of ergot as administered by mouth and rectum, but, in more or less of a haphazard fashion. Our attention has recently been called to the possibilities of this therapeutic agent by Dr. Korndoerffer in varied dosage and type of administration. Acting upon his recommendation for its use, I have been very agreeably surprised in many instances in the almost immediate effect in the control of the after-pain. Like ergot, it has not proved to be a specific or a panacea, but in the majority of instances, it has either immediately controlled, or produced amelioration. In two very recent cases, for example, after the administration of pituitrin, there was noted an aggravation for a period of one hour, but subsequent to this time, the patients were absolutely comfortable and remained so. In another case, even though the pituitrin was repeated several times, there was absolutely no effect on the pains.

In a general way, in my own experience, it has seemed that pituitrin offers itself as a much more potent therapeutic agent under such circumstances than our former remedies. We naturally propose to continue its use in a series of cases in order to see comparative results.

DR. KORNDOERFFER (closing).—I am perfectly frank to say I cannot explain the action of pituitrin in this condition. I will say that where I have given ergot we have seen absolutely no blood clots come from the uterus following its administration. I think it is begging the question when obstetricians state that the after-pains are due to retention of minute clots. The fact remains that I have seen severe after-pains where no membrane was discharged at any time and it is that fact which makes me believe there is a deeper cause explaining the after-pains. It is my impression that these pains are due to altered condition of the posterior lobe and although we know it is the anterior lobe of the pituitary which most actively participates in the hypertrophy of pregnancy, I cannot but believe that the anterior is closely correlated to the posterior lobe. I believe there exists a condition of what may be described as hypopituitarism although I believe the word is poorly chosen and does not express the thought we wish to convey. I believe there is an altered pituitary secretion. Whether that is altered in quantity or quality I do not stand willing to say and I believe that that primarily is the way the after-pain is relieved.

A Symposium on the Treatment of Cancer of the Uterus with Radium

DR. WILLIAM L. CLARK.—When I first engaged in the study of electricity in relation to the treatment of malignant disease nearly fifteen years ago the only serious methods employed by gynecologists for the treatment of cancer of the uterus were the curette, cautery, and operative surgery. Radium at that time was not considered a potent agent in the treatment of malignant disease. The curette and cautery were extensively employed as a palliative agent to get rid of the gross diseased mass, to stop bleeding, to deodorize, and to inhibit the disease. This treatment was invariably followed by recurrence, since the superficial action of the curette and cautery was inadequate to remove all the disease, but the use of these measures was, however, amply justified as a palliative in the absence of any more potent remedial measure. The results obtained by radical operative surgery, even in the early cases were unsatisfactory except in a very small percentage, hence treatment of cancer of the uterus was in a chaotic state and any improvement of these cases by any means was considered pure gain.

My studies with the high frequency currents led me to believe that these could be used to advantage as a substitute for the curette and cautery as a palliative and possibly in selected cases, if seen early enough, could effect a cure. The reason for this belief was based upon the following observations:

1. The heat penetration and deep destruction of tissue could be accomplished by this means, whereas the effect of the ordinary cautery application was comparatively superficial.

2. That the gross mass of cancerous tissue could be coagulated to any depth quickly and thoroughly.

3. That this treatment was not accompanied by bleeding; indeed, that severe hemorrhage could be stopped immediately.

4. That blood and lymph channels could be sealed, thereby avoiding reinfection, and inhibiting extension of disease and metastasis.

5. Results of experiments seemed to indicate that the heat penetration beyond the area actually coagulated had an inhibitory or destructive effect upon cancerous cells in the broad ligaments and even in the pelvic glands. This belief was based upon the fact that cancer cells succumb to a lower degree of heat than normal cells with recovery of normal cells.

6. That, owing to thorough sterilization of the cancerous mass, it could be deodorized.

7. That the action of the current could be controlled with precision after studying the characteristics of the current and employing proper technic.

8. That since satisfactory results were obtained in malignant disease in other anatomical locations, it seemed feasible the same effect could be obtained when applied to the uterus.

A series of thirty-six cases of cancer of the uterus, varying from incipiency to advanced stages, were treated by the electrocoagulation method. The results justified the belief that the electrocoagulation method was superior to the curette and cautery, since in my experience a longer period elapsed in most cases before recurrence and in some of the early cases apparent cures were effected.

When radium came into use by gynecologists, after studying the reports of Dr. John G. Clark and others, I felt that perhaps a more potent agent than electrocoagulation had been found. Not then having radium at my personal disposal, I referred my uterine cancer cases for radium treatment. Sixteen cases in all were referred and the results of treatment followed with interest. My conclusions after studying facts were that the results obtained were not any better than those obtained by the electrocoagulation method combined with x-rays; in fact the results obtained by the electrocoagulation method combined with x-rays appeared to be even better. After studying the radium problem and comparing the results of various workers, I noted a discrepancy in the reports of gynecologists of equal attainments. Some were enthusiastic about the value of radium, others had not yet formed definite conclusions, while others condemned its use altogether. Laboratory studies undertaken by trained physicists working in collaboration with physiologists and pathologists in different parts of the world seemed to show that radium produced a definite lethal action upon malignant cells in varying depths depending upon the dosage, filtration, etc., The difference in clinical results by different men and the discrepancies in the laboratory and clinical results led to the conclusion that, with improved technic, better results could be obtained. It was found that most gynecologists and radiologists depended upon the radium capsule inserted into the cervical canal, or capsules in tandem inserted up as far as the fundus. Sometimes a radium capsule was placed against the cervix without insertion into the canal. It seemed obvious that under these conditions it was impossible to irradiate the tissues to a sufficient depth to influence malignant involvement of the broad ligaments and structures remote from the point of contact and that this was the reason for disappointment.

Having procured some radium in hollow, metallic needles, I tried combining the capsule or capsules in the cervix or body of the uterus, using standard filtration, with radium needles inserted at the extreme margin of the cancerous mass, care being taken to avoid the ureters, also not to insert the needles into the bladder, rectum, or peritoneal cavity. It would seem that the radium rays by this combined method of application would penetrate farther than when the capsule in the cervix was used alone and that, instead of having a large quantity of radium concentrated at one point, by means of the radium needles cross-fire radiation from needle to needle would be accomplished, rendering the rays received by the tissues more homogeneous and equally divided. It appeared that this radium treatment might be powerfully supplemented by massive x-ray treatment according to standard technic with portals of entry suprapubically, laterally, through the back and through the perineum. This treatment was applied to thirty-one cases. Such astonishing results have been obtained by these combined methods during the past four years that I certainly recommend them as an improved technic of employing radium to cancer of the uterus.

In some cases where there were large necrotic masses, it seemed a good plan

to destroy the mass first by the electrocoagulation method so that it would not be necessary to irradiate such a large area. This has been practiced in some cases to advantage. If the tissue is firm, however, radium needle, capsule, and x-ray treatment combined may be employed without electrocoagulation. With proper dosage and filtration there will be no slough, the malignant tissue will retrogress and entirely disappear leaving in its place pale fibrous tissue. I shall not at this time attempt a statistical study of results, but in the near future hope to present in proper form what has been accomplished.

It has been suggested by some gynecologists that it might be advisable to practice hysterectomy after converting the case into an operable one by the use of radium. The question of the advisability of this is still in abeyance. It was practiced in two cases and the gynecologist was astonished at the freedom from malignancy in the uterus, also at the ease with which the operation was performed, since, owing to the action of the radium upon the blood vessels, the operation was comparatively bloodless. It was found in one case, after opening the abdomen, that there was some malignant disease in the tissues anterior to the rectum, also of the bladder wall, which could not have been detected without laparotomy. Radium needles were therefore inserted into the growths through the abdominal opening and left in place twenty-four hours, when they were easily withdrawn. An exploratory incision after radium has done its work should be seriously considered for the purpose of performing a hysterectomy or panhysterectomy if, after examination of the parts, this seems advisable, and to inspect the whole pelvic cavity, that radium in needles might be applied if there was any disease that had hitherto escaped notice. I believe some lives could be saved if this were practiced, since it may be done with comparative safety and some disease might be found that could not be discovered by any other method of examination.

Notwithstanding the opinion of one of our distinguished colleagues who says that radium is of no value in the treatment of malignant disease, we can definitely state that he is mistaken. It has not by any means failed. The future with improved technic of application will undoubtedly show it to be of greater value than is realized at the present time and when we consider the little hope that could be offered by the older methods, radium is a welcome addition to our armamentarium.

DR. GEORGE E. PFAHLER.—I will begin where Dr. Clark left off. I have had, as Dr. Clark has had, some patients who were very much distressed by the newspaper reports that have been circulated during the past two weeks or ten days. I have had some discontinue treatment. I have had others say, "Well, if it had not been for radium I would not be alive." It is a pleasure to hear that and annoying to hear the others. There are a great many people who have been made unhappy and discouraged. Some of them have entirely given up any form of treatment as the result. We must bear in mind that this subject of radiology is only at its beginning. It is being investigated by a number of skilled and careful men, but we must understand by comparison, surgery is hundreds of years old and surgery can claim today the most brilliant minds probably in the whole profession. What does radiology have by comparison? A few men who have taken this work up enthusiastically, many of them well trained, but they have almost no experience to go by, there is no preceding teaching. What is more, surgery has hundreds of millions of dollars invested in hospitals which have gradually built up surgical experience and yet the surgeons have not cured cancers and are not curing a sufficient number to be satisfied, or we would not have this subject under discussion tonight.

Therefore, why make this comparison? Don't forget that practically all the development of radiology up to the present time has been upon the basis of surgical failures, patients that have either been cast aside as hopeless from surgery, or that have been operated upon and the disease has recurred and then they are turned away to the radiologist for treatment. That is not imagination, it is an everyday experience with everybody who is using either radium or the x-ray and of all the optimistic people in the world none perhaps can equal the surgeons who have operated on the disease in the beginning, have had it recur and then assure the patient he will get well under radium. Now anybody can go into any good radiological laboratory, and spend a day and I believe there is not one of these laboratories from which the visitor will go away unconvinced of the value of radiation in the treatment of malignancy. Some time during the day they will see a case in which there can be no question of the value of radium and what it has done.

Coming to the real subject for which we have met tonight: When we discuss this subject of carcinoma of the uterus we must classify our cases, namely, first, the operable class, in which the disease is confined to the uterus and can be operated upon with reasonable success. When the disease has spread from the uterus into the vagina, into the parametrium, into the lymphatic glands then at the very beginning, they may be classed as borderline. These later may be termed as inoperable. Then we have the recurrent cases, which, of course, belong to the inoperable group because they have invaded the surrounding tissues. And finally the hopeless cases that are so far advanced that there is no hope of reaching all the disease by any means. Now these are the five groups of cases that we must deal with. There is only one group of the whole five concerning which we need to make any comparison with regard to surgery. With regard to the other four groups, what are you going to do for them? Now it is not the radiologist, pure and simple, today that is most enthusiastic about the treatment of carcinoma of the uterus by radium. It is the surgeon and the gynecologist who have taken up radiation thoroughly and have had a large clinic to work with and have had a reasonable quantity of radium, who are today the most enthusiastic. Dr. John G. Clark, whose work and results no one will question, says that his operable group is becoming less and less. Others have claimed that none of them should be considered operable any more. It is the gynecologists who have had experience with operation and experience with radiation and have come to this conclusion and there are a number of these who are not operating on any carcinomata of the uterus. Now there are some of these operators, such as Schmidt and Bailey, and several others, who have taken up the question of doing operation after the radiation. Dr. Schmidt, of Chicago, who is in charge of the gynecological clinic of two of the largest hospitals in Chicago, told me last week, when I asked him "how soon should a patient be operated upon after the application of radium in operable cases?" He said "Why operate? Radium will cure the disease if it is still in the uterus, and if it is outside surgery won't cure the disease and there is where it ends all." I applied some radium for one of our leading gynecologists week before last and I telegraphed to two of our leading men who have had the most experience in this line of work because the gynecologist intends to operate shortly after this application of radium. I wanted to advise him when it would be best to operate. I was not opposed to operating. The word came back from Dr. Bailey, of New York, saying, "If you have applied 2,000 mgs. hours in a carcinoma of the cervical canal operate within a week; if you have applied 4,000 mgs. hours operate after four weeks."

In a certain group there is still a question whether you should operate or not. I think the surgeons and gynecologists who have had experience should operate.

It will help them to find out what is best to be done and give the woman the advantage of surgery and radiology. The borderline cases have a better chance from radium than from operation. We cannot lay down any rule as to the application of the rays, because every case differs somewhat, but in general I think in this group where the disease has extended to the walls of the vagina, or even into the parametrium, that it is wise to make an application of radium against the cervix and the diseased area and then introduce radium into the uterine canal. I should use 100 mg. for 24 hours in radium pack; with vaginal walls and bladder packed as far away to prevent irritation. The bladder for this purpose should be emptied, if practicable kept empty by means of the catheter. The rectum should be thoroughly cleansed preceding the application of the radium. If we are going to treat carcinoma of the uterus we count on using 5,000 to 7,000 mg. hours. This is about the total amount you can use without causing too much destruction or injury of other tissues, but in these advanced cases where the disease has extended into the parametrium, or lymph nodes of the pelvis, we should add x-ray treatment, because by this process we can carry a certain amount of radiation into these diseased areas through the abdominal wall and we will get more cases well.

Now there has been a great deal written, especially in Germany, about the high voltage current. These voltages are gradually increased. An investigation by Dr. Coolidge led him to conclude that they were using very little more voltage than we were, but they were measuring by a different process and that they were using about 140,000 volts in comparison with about 127,000 volts that we were using, providing we spoke in the same language. We, however, speak of that same current generally in America as 90,000 volts. There are being developed machines that will produce 200,000 and even 300,000 actual effective voltage. That gives us radiation that approximates, though does not equal the gamma rays of radium and gives it to us in much larger quantity than we can get from radium. I believe when our technic has been thoroughly developed for that high voltage that we will accomplish results such as we cannot possibly hope to accomplish today. I must say that I am afraid of the propaganda that has been developed concerning this high voltage. I am afraid that a lot of untrained and enthusiastic people may take this high voltage up without sufficient training and do harm. I am getting letters every day from hospital authorities asking what they shall do about this matter. I think within a year we will have something we can use and depend upon.

Now in regard to the recurrent cases and the hopeless cases. I will first illustrate one of these inoperable cases that I have just spoken about. About a year ago Dr. Laplace at the Misericordia Hospital turned over to me a woman who had an inoperable carcinoma involving the entire cervix, with enlargement of the whole uterus and with extension of the carcinoma around three-fourths of the upper portion of the vagina and extending downward about an inch. I applied 100 mgms. into the uterine canal, filtered through 1 mm. of platinum and 1 mm. of rubber. At the same time I placed against the cervix 100 mg. of radium in pack. I left it 24 hours. In three weeks I applied the x-ray through the walls of the pelvis anteriorly, posteriorly and laterally, giving all the skin would stand in a period of a month. So far as any of us could tell all of the disease had disappeared and she regained her health perfectly. When I examined her in July there was apparently none present. She may die ultimately of the disease, but if she does we will have prolonged her life. That is an illustration of what we get in some of these very advanced cases which are inoperable. It is not a question of comparing surgery with these cases.

The recurrent cases are to me very discouraging. You may have a com-

paratively small amount of disease in the recurrence, but you cannot make the same impression. You may get the disease to disappear temporarily, but it recurs very generally. In the recurrent disease if you can treat thoroughly with the x-rays and destroy the local disease by implantation of radium needles, it is probably the best procedure.

DR. BROOKE M. ANSPACH.—About nine years ago, Dr. John G. Clark and some of the members of his staff went to Baltimore to spend the day with Dr. Kelly, who was then starting his work with radium. He was very enthusiastic. We came back hopeful, but skeptical. It happened that I had a patient who had been operated upon three or four months previously, a woman of sixty-five, with an advanced cancer of the cervix, for which I could do no more than curette and cauterize. She had been given the usual treatment with acetone, and had rapidly failed. I had spoken of Dr. Kelly's ideas with one of my associates, who was related to this woman, and he wished to try the radium in her case. Through the courtesy of Dr. Kelly, I obtained some emanations and later, some of the radium salt. The patient at that time, was rather emaciated, she had lost 40 pounds, there was a marked degree of anemia, an irregular temperature, constant pain which required opiates, and the vaginal discharge was so offensive that the burning of deodorizing cones was required. Her family were very much opposed to any plan of treatment, one physician having advised that she be given opiates and allowed to die. It was only after explaining the simple plan of placing the radium in the carcinomatous crater that the consent of one of her daughters was obtained. To make a long story short, within six months this woman had regained her usual weight, her blood picture was normal, she had no pain, and she did her own housework. She had a small rectovaginal fistula, which gave her very little trouble. She lived for four years apparently in good health, and then died after an acute illness of four days. No autopsy was allowed, so that I am unable to state the cause of death.

No one will deny that if a cancer is entirely localized in a certain spot, surgery is the best method of treatment, the surgical procedure being a removal of the carcinomatous area with a wide circle of normal tissue.

In the case of cancer of the cervix, the operation is difficult even in the early stages, and one man in the course of his surgical work has a comparatively limited experience. So far as I know, the largest experience was that of Wertheim, who, four or five years ago, reported 250 cases which he had operated on and followed for a period of five years, and in them the percentage of absolute cure was less than 20. In other words, less than one-fifth of the cases of cancer of the cervix which applied for treatment in his clinic were cured, a very discouraging result, and especially so, in view of the fact that in the earlier operations his mortality was as high as 25 per cent. As his experience and technic improved, the mortality was lowered, and of the whole series, if I remember correctly, it was about 11 per cent. As these facts demonstrate, surgery has not done all that might have been expected of it for cancer of the cervix. Moreover, there are few cases of cancer of the cervix seen in such an early stage that a cure appears feasible by a wide removal of the diseased area. In the face of such a situation, the remarkable result following the use of radium in the case which I have described, encouraged me to make a further use of it. I have no statistics of my own, as my cases were grouped with those in the gynecological service of Dr. John G. Clark at the University Hospital. Dr. Clark and Dr. Keene have recently reported the results in the series. The report deals with 313 cases. These include carcinomata of the uterus, vagina and external genitalia. At the end of four years, 24 per cent were alive and

free of recurrence. In 60 per cent, there was local healing, that is, there was no bleeding or discharge. In a considerable percentage there was relief of pain. In about 10 per cent, the radium seemed to increase the rapidity of the growth, and in about 10 per cent, the use of radium was followed by the development of fistulae. Fistula as the result of radium treatment was more frequent in the cases treated earlier in the series than in the late ones, because in the late ones knowing more about the dose, fistulae could be avoided. Early in the series, every case of carcinoma was exposed to a maximum dose. Later, the very bad cases, that is, those in which the disease greatly involved the vesicovaginal or the rectovaginal septum were not treated at all, or at least, not given a full dose. When a full dose is given under such circumstances, fistulae invariably follow, and this adds to the misery of the patient, while ultimately it does them no good. At the present time, a smaller dose of radium, say one-half the usual dose, helps the discharge and the bleeding, does not produce fistulae and probably is the best method of treatment. The dose of radium used in this series was usually 100 mg. for 24 hours, or 2400 mg. hours. At first, in most of the cases this was applied in capsule, but recently needles have been employed, at least in part. As a result of experience, it is wise to give a full dose at the time of the first application, and it is unusual to derive any more benefit from a second application. There are, of course, exceptions to this rule.

The explanation offered by Clark and Keene for this fact, is that after the first treatment with radium, the cancer cells which remain are rather closely imbedded in the fibrous tissue, and the fibrous tissue itself being subnormally vascularized, may be itself affected by the radium. Recurrent cases are not favorable ones for the use of radium on account of the scar tissue, in which the cancerous cells are more or less embedded.

The ideal surgical procedure in early cases of cancer of the cervix would seem to be panhysterectomy immediately following the application of radium. I have had only one case of cancer of the cervix during the past year in which the cancer appeared to be early enough to make operation the procedure of choice. This carcinoma was in a young woman of 31 who had had one pregnancy ending in miscarriage at the fifth month. It was of the glandular type, and in spite of the previous radiation with a 100 mg. of radium for 24 hours, and the removal of the vaginal cuff and of the cellular tissue at the base of the broad ligaments and a perfect surgical convalescence, the disease recurred within six months in the iliac glands and she died. Notwithstanding the unfortunate outcome, which may be explained on the grounds of an unusually rapid growth, I believe this is the procedure of choice in the early cases. In carrying out such a plan, one must be very careful that the radiation is confined to the carcinoma itself and does not affect the vaginal fornices; otherwise, sloughing may take place.

DR. JOHN A. MCGLINN.—All during my teaching career I have emphasized early diagnosis in cancer but the plea for early diagnosis and for the treatment of the precancerous lesions, in this country, at least in my experience, has not borne results. I very seldom ever see a case of really precancerous cervix. Although the extent of operability as the result of Wertheim's operation has undoubtedly increased yet it is very seldom we see a really operable case in comparison with the inoperable type. Wertheim in his early cases had a tremendous operative mortality. Then after developing his operation his operative mortality decreased, the extent of operability increased and yet he was able to cure about 20 per cent of his cases and that result has never been attained as far as I know in any other clinic. The Wertheim operation is a very difficult operation. I have attempted it a number of times, I have never prop-

erly performed it. Very few men in this country would have the temerity to risk the tremendous operative mortality by doing the operation to perfect themselves in the operative technic. So that I think it is safe to say that in no clinic in this country have Wertheim's figures ever been approached and the best you can hope for in clinics of the United States is at least 10 per cent in all cases of cancer of the uterus. I personally, have two cases living and well over the five year period from operation. About two years ago a woman walked into my hospital and that woman two years afterwards from an absolutely inoperable condition was absolutely free from disease and that was by the use of radium. A case that Dr. Clark speaks about a year and a half ago, weighed 80 pounds, hemoglobin of 30 per cent; she was bed-ridden and I would not give her two weeks to live. I have examined her since the radium treatment and her uterus is freely movable and there is no sign of cancer anywhere in the woman's pelvis. I saw a woman recently who had a fibroid of the uterus about the size of a bucket, the whole cervix was absolutely destroyed by a cauliflower growth. I took her to the hospital and she had a terrific hemorrhage after the use of the radium but this was readily controlled by packing. Because she had this hemorrhage I felt dubious, but four weeks later the uterus was half the size and healed over with normal mucous membrane. I then sent her to Dr. Pfahler for intensive x-ray treatment. Even though she had extensive thickening in the base of the left broad ligament, she is as free from cancer as physical examination can determine. I am not saying she is cured of her cancer. I am satisfied she is cured of her fibroid. I had a case only recently, absolutely inoperable, whom I examined ten days after the application of radium and the cervix was normal size, covered over with mucous membrane and you could not tell that woman had ever had a child, everything was so absolutely normal so far as the cervix was concerned. There is no question that in the inoperable cancers of the cervix, radium is the only thing to use. The important thing to be decided, and it can only be after more experience, is whether we should discard surgery, whether we are justified to use surgery, if we are going to do the proper operation and assume the high operative risk, or use radium in the operative cases where there is practically no risk. The best review of the subject appeared in Taussig's article in THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY. Statistics show there is practically no difference between radium and operation in Wertheim's clinic, but even in five years the technic in the application of radium has developed and is going to develop still further; whereas the technic in the cases referred to surgery is almost a finished article. Personally, I feel that if I met with a case of cancer of the cervix, an early operable case, I would use radium on it and not surgery. I am perfectly convinced if I had a member of my own family with early cancer of the cervix, knowing what I do of the effect of the unoperated cases, that it would be radium and not surgery.

DR. STEPHEN E. TRACY.—Unfortunately carcinoma of the uterus is so far advanced before the patients seek medical aid that we cannot expect a large percentage of permanent results by any method of treatment. I quite agree with Dr. McGlinn that the main thing is to educate the public on the cancer question so that the dangers will be recognized and the patients come for treatment early. It is pretty generally agreed that carcinoma of the corpus uteri, if seen at all early, should be treated by surgery. The results from surgery in the treatment of carcinoma of the cervix uteri have been so thoroughly unsatisfactory in the vast majority of cases that any form of treatment which promises relief for these patients is worthy of consideration and serious investigation.

There is another factor to be considered and that is the type of cancer with which we are dealing. Some cases in which we expected good results, were most disappointing; while good results were secured in what seemed hopeless cases. One patient, who had an extensive carcinoma of the cervix uteri, on whom we did a radical operation, is alive and well over twelve years after operation. Another patient is alive and well more than eight years after operation. I have had several advanced cases of carcinoma of the cervix uteri, on whom extensive cautery operations were performed, and some lived three and four years, and one nearly five years after operation. Most cases of carcinoma of the cervix uteri are beyond the operative stage when seen. Dr. Pfahler is seeking information as to whether patients treated with radium, in whom there is a marked improvement, should subsequently be subjected to surgery. Few men are willing to do a really radical operation on these patients, and, if there is a marked improvement, or an apparent cure, it would seem wise to leave well enough alone. There is no doubt, as Dr. Pfahler stated, that the cases which have been sent to the radiotherapists for treatment were either the hopeless cases or the ones in which there had been a recurrence, and radiotherapy has certainly done something for a certain percentage of these patients.

DR. RICHARD C. NORRIS.—I have considered treatment by radium and x-ray too technical to attempt its use and refer my patients to those specially qualified by training and experience. The diagnosis is very important and must be demonstrable in reported results. I distrust radium for its absolute curative value in uterine carcinoma in the early stage. To report a few cases of extensive carcinoma which are brilliantly and wonderfully cured and say nothing about all the other cases of failure, especially early cases not benefited, is not convincing. Each man tells of the cases that have been benefited. Many of these cases make us have the hope that future development of radium and x-ray treatment will prove efficient in all cases. Until we know more about cancer, in fact until we know more about radium, we cannot appraise its true value. It has occurred to me, and clinical experience bears it out, that in supposed early cases if cancer cells are deposited in the broad ligaments or elsewhere beyond the reach of surgery, there will be recurrence; if they happen to be beyond the influence of radium, then recurrence will also follow radium treatment. It is impossible to know to what extent this involvement may have occurred. We preach the doctrine to the laity and to our profession of early diagnosis, but until we know more about the cause of cancer and have more reliable early clinical and laboratory means of diagnosis it will even be too late in many cases to cure either by radium or by surgery. After the appearance of the first suggestive symptom, in a patient previously well, the patient goes through treatment by surgery or radium and dies promptly from recurrence. Another perfectly analogous case goes through radium or surgery and is alive eight or ten years afterwards. Such cases make me believe that very often it is not given to us to detect the beginnings of cancer or the degree of involvement in time for surgery or radium to cure. When we know more about cancer and its cause the future may throw light on many of these dark problems and early diagnosis, perhaps through serological or other laboratory method may aid us, but as I see it now certainly anyone near and dear to me with a suspicious or accurately diagnosed carcinoma of the cervix, and certainly of the uterine body, in what we now call an early stage, I certainly would not trust to radium. I would send her to a surgeon and radiate her afterwards with the proper precautions against fistulae. I think Dr. Deaver meant what he said, that the actual curative value of radium is overestimated as a routine procedure and that there was growing up a class, or group of radium practitioners who were holding out the hope to the

laity that in radium we had found a well recognized cure for cancer. I believe Dr. Deaver meant what he said when he said we had not found that cure and I think the public needs to know it, to be protected from these men who claim it is a cure.

We are in the stage of investigation; no man can make absolute statements; we only know the usual hopelessness of surgery, we are finding out more and more the all too frequent hopelessness of radium as a cure. Another plan must come. Let us teach the woman at the menopause to seek her doctor, let us teach the doctor to be on the lookout for carcinoma, but if both woman and doctor are ever so urgent to find out if there are evidences of beginning cancer, we will still have cancer as an elusive disease. We can help ourselves improve our results because we do know that some early cases do get well, but not enough to satisfy us. With our present scant knowledge I believe the result is dependent upon the degree of involvement, the patient's resistance to and the character of the invading agent. When you cut or radiate beyond the area of involvement and get it all the patient will recover and the fact that not more than 10 to 20 per cent of cures follow means that in only 10 to 20 per cent do we reach and destroy all invaded tissue. Clinical diagnosis cannot at the present time make that selection of cases. We are forced to stumble on in the darkness, but let us remember that radium has not proved itself a cure for cancer because it sometimes brilliantly helps some aggravated cases that we know the surgeon cannot help. Let us be skeptical, let us have the evidence, not partial evidence, not hopeful evidence, but actual scientifically determined evidence by the results of radium treatment all over the world. In the meantime we do not wish to decry the use of radium. We want these men who have invested large sums of money and many hours of labor to make more and more effort in their investigations. We are not in a position to say that surgery should be abandoned or that radium and x-rays should be our only hope. They go together and if there is any value in radium to destroy a cancer cell I cannot understand why, in early cases, after you remove all you can surgically, radium or intensified x-rays should not be of value to destroy any cancer areas left behind within the range of safe radiation. If it can search out and destroy involved areas that we know the knife cannot safely reach, it surely should be so used and the radiologist should work out a technic efficient for that purpose and freed from danger of fistula. I defy anyone to tell by any means of examination, that in a particular case beyond the reach of surgery radium will reach and destroy all of the disease. The results show that it very often fails. In the early case I should prefer the surgery first and the radium afterwards. In advanced cases our only hope is radium and the x-ray, and in most of these cases they only palliate but do not cure. Their palliative value is unquestioned.

DR. GEORGE W. OUTERBRIDGE.—There is one point in the technic in handling cases of carcinoma of the cervix concerning which I should like to have the opinion of the radiologists. This is the question of removing by cautery, purely as a preliminary measure before the application of radium, as much tissue as possible through the vagina. In my association with Dr. Nicholson, this has become practically our routine procedure in advanced carcinoma of the cervix, especially those cases with large friable, easily bleeding, cauliflower masses projecting into the vaginal vault. As we understand it, the penetrating power of radium is distinctly limited, and it would seem rational, therefore, to remove mechanically, as much as possible of the malignant tissue, so as to be able to apply the radium that much closer to the deeper tissue, if this can be done with no danger of excitation of the growth. For this purpose, we have been using the Percy cautery, not at all as Percy uses it, with an idea of cooking surrounding tissue, but as a hot cautery for actual cutting away and cauterizing, because it carries the heat

so much better than the ordinary small cautery knife. The operation can be done under nitrous oxide anesthesia and takes but a few minutes. I understand that at the University of Pennsylvania the feeling is against using the cautery preliminary to radium; it may be that this procedure is absolutely of no value; it may be that it does actual harm.

I should like to have an expression of opinion on this subject from the radiologists present.

DR. CLARK (closing).—My experience has been that it is very unwise to remove cauliflower growths by cautery or other means. Unless you can destroy cancer by one sweep of cautery, you had better not attempt the use of heat. I have seen many cases stimulated by this means. I have had cases of so-called fulguration and these cases almost invariably grow like wild fire. Unless you can get it all it is better not to use the cautery. Of course if you use capsules alone it might be the lesser of two evils to remove the gross mass so that the radium might penetrate, but where needles and shanks are used, the mass can be penetrated to the desired points; so it is unnecessary to remove a portion of the mass and I would strongly advise against it according to my own experience.

NEW YORK ACADEMY OF MEDICINE

SECTION ON OBSTETRICS AND GYNECOLOGY

STATED MEETING, HELD DECEMBER 27, 1921

DR. WILLIAM P. HEALY IN THE CHAIR

DR. HARBECK HALSTED reported a case of **General Edema of the Fetus Associated with Osteogenesis Imperfecta.**

Osteogenesis imperfecta is used as a general term to cover all imperfections in the development of the bones, consequently in the aggregate it is quite a common condition while at the same time any single type may be very rare. Ballantyne, who has gone into the subject very extensively, divides fetal bone diseases into five types and, after careful consideration, I am unable to place this case into any one of his divisions. The main defects in this case seem to be in the long bones and the bones of the skull. The long bones are very short and friable and there are evidences in the x-ray pictures that fractures have occurred *in utero*, with subsequent healing, in one place making a marked angulation, and in other places just represented by callus. The skull bones are only represented by small plaques of bone.

The patient was white, born in the United States, of American parents, a primipara. She was delivered November 13, 1921, about the seventh month. The mother was toxic and edematous. There was no history of any monster in the family. The patient does not remember having had the ordinary diseases of childhood. She had frequent attacks of tonsillitis and her tonsils were removed when she was ten years of age. She had jaundice when fourteen years of age. She began menstruating at fourteen years, regular, moderate. The first six months of this pregnancy were absolutely uneventful. One month before admission her urine showed a trace of albumin. She was given a vegetable diet and the albumin soon disappeared. One week before her admission she began to develop edema and a little albumin, and the blood pressure began to rise. These symptoms grew progressively worse and she was admitted to Sloane Hospital, Nov. 12, 1921. At this time her blood pressure was 170 systolic, 110 diastolic. The urine was acid, specific gravity 1,020;

albumin 85 per cent by gravity; an occasional red blood cell; many pus cells and an occasional hyaline cast. The patient was put on a salt-free, protein-free diet, and given morphine. The next morning she was given a colon irrigation, castor oil and quinine. Labor soon set in. The presentation was breech, R. S. A. After a few hours the breech and both feet presented at the vulva. Gentle traction was made on the right foot; the foot and part of the leg just above the ankle pulled off. Gentle traction was then made in both groins and when the baby was born it was seen that both groins had been split nearly down to the bone. As soon as the baby was born the cord broke about two feet from the baby's body. The stump of the leg and both tears in the groin bled for a short time and then stopped spontaneously; the cord did not bleed. The child's heart was beating and it took several breaths but soon died. The placenta and membranes delivered spontaneously almost immediately after the birth of the baby. The baby was a premature male weighing 3 pounds 9 ounces and was 32 cm. in length. The tissues were edematous, very friable, and very little bony structure could be made out by palpation. The skin was thin and easily macerated. The feet, legs, arms, and hands were short, deformed and flattened. The placenta was large, jelly-like, and very friable.

The patient bled rather freely postpartum, so was given ergot and pituitrin, and these were repeated in one hour. She was also given morphine and this was repeated in three hours. One hour and thirty minutes after delivery she seemed to be in fair condition and was put to bed. Almost immediately she had a convulsion. In the following two hours she had two more convulsions of slightly longer duration. After this she gradually improved, her blood pressure dropped and the urine gradually returned to normal.

Sections of the placenta showed only a few small villi; the majority are covered with a thick layer of syncytium. The villi contained many small vessels but very few large and conspicuous ones. The impression was given of less vascularity than normal. In some of the villi the connective tissue fibres were moderately separated, as if by edema; many, however, were compact. Microscopic examination of the cord showed the fibres of Wharton's jelly markedly separated, suggesting edema. The intima of all the vessels in the cord was markedly and irregularly thickened.

DISCUSSION

DR. L. T. LEWALD.—I do not believe the bone lesions are specific, and I think the history of the case bears that out. One must differentiate osteogenesis imperfecta from achondroplasia which is a peculiar type of bony development and which is also not specific. Both these are sometimes confused with syphilitic conditions. I regret that the microscopic study of the bone has not been made, and hope that some light on the etiology of the condition may result from it. The radiogram showing the healing of fractures *in utero* with the production of callous formation is exceeding interesting, and is a condition I have not seen before.

DR. H. C. WILLIAMSON.—I have had a case somewhat comparable to this, a para iii, delivered at the eighth month. She showed general edema before delivery and had six convulsions postpartum. In this instance the neck of the fetus was broken and there was a fracture of one humerus, but no radiograms were taken. The postmortem examination revealed acute degeneration of the kidneys, liver and spleen. The Wassermann reaction was negative.

DR. ABRAHAM RONGY read a paper entitled **Primary Sterility: A Study Based on 400 Cases.**

Dr. Rongy believed that the reason we cure relatively few cases of sterility is because our entire conception of the etiology and treatment of primary as well as

relative sterility is entirely erroneous. The mechanical theory of sterility is untenable, and a new, and for the time being, a very promising and almost fascinating discovery has been "sprung" on the profession. The organs of internal secretion have been held responsible for all the ills to which human flesh is heir. Every sterile woman has been given all sorts of combinations of organic extracts. We soon found, however, that they were falling far short of the claims made for them. I feel that if we blindly accept the theory that the organs of internal secretion are responsible for sterility, we shall again be led astray for another thirty years, and in the meantime out attention will be detracted from the true causes of sterility in the largest number of women.

During the last decade, man's share for the responsibility for the sterility has, in my experience, undergone a great change. In a paper published by me in 1911, I found that the husband was at fault in nearly 50 per cent of the cases, and this coincided with the experience of a number of observers at that time. In this series it is less than 11 per cent. I believe that the educational campaigns conducted by the medical profession and the various public health agencies are just now beginning to bear fruit. While we have thoroughly investigated the male aspect of the question, and interesting points have been brought out from the academic standpoint, I feel that they have no practical value. In the light of our present knowledge we must pronounce the men well, if the examination of a condom specimen shows fully formed and viable spermatozoa. A number of our patients were inseminated; the semen was lodged high in the uterine cavity, in the hope that ovulation might be helped in that way. Not one of these patients became pregnant. The failure of conception to take place in these cases seems to indicate that something is wrong somewhere "higher up," and I am sure that if the problem of sterility is to be solved at all, it will have to be investigated from a purely biological and chemical standpoint. A great many women who are sterile have practically the same developmental characteristics; they are short, fat, stocky, and give a history of menstruating very irregularly.

Anatomic defects in the bony pelvis, were not found with the x-rays. A group of women and their husbands were selected for the purpose of having their blood typed, in the hope that it would show a characteristic grouping, but no material difference was found in the grouping between the sterile couples and those who had one or more children. Other experiments were carried out which showed that diet had no direct relation to sterility. It is my experience that those patients who give a history of having developed sudden and severe pain during the second or third day of their menstruation three or four years after puberty, are more likely to be permanently sterile. Inquiry was also made into the possible relationship between the exanthematous diseases and sterility. It is my impression that there is a greater prevalence of sterility among the women, who during their infancy or childhood had troublesome throat infections, also that women who had had scarlet fever, complicated by severe kidney disturbances, were not so likely to be sterile as those women who had a simple uncomplicated scarlet fever. While this is highly speculative, I feel that something might have taken place during an attack of scarlet fever or diphtheria, which prevented the ovary from properly developing and possibly at the same time caused permanent structural changes.

It seems to me that as yet, the endocrine label is but roughly qualitative and crudely quantitative, nevertheless the analysis of this series of cases from the endocrinological standpoint brought forth the interesting point that in answer to the question, "Whom do you resemble, father or mother?", 221 patients said that in physique and features they resembled their father, and 85 patients said they resembled their mother. While this may be purely accidental in this series of cases, nevertheless it may have some bearing from the biological standpoint.

A number of women were selected showing no evidence of inflammatory changes

in the pelvis; they were given no treatment whatever, except a placebo from time to time. All of them were married a year or longer. Of 36 of these patients 6 became pregnant, four being delivered of full term babies. This is the best illustration that sterility is very often temporary in nature and that in a certain number of women some readjustment takes place and pregnancy ensues. I believe that no marriage ought to be considered sterile until two years have passed.

I cannot help feeling that displacement of the cervix and uterus plays a very small rôle in the etiology of sterility. The only findings of more or less importance are: (1) The small infantile body of the uterus, which is narrow from side to side, is usually associated with a small conical cervix and is frequently found in fair women. (2) The large hard body of the uterus with a long hypertrophied cervix and a history of rather profuse menstruation, which is usually found in the tall, dark, masculine type of women. To me such findings indicate a most unfavorable prognosis. I am sure that if these patients were let alone, some of them would have a better chance to become pregnant, for the various operations performed on them often result in the closure of the fallopian tubes, causing permanent sterility. Patients in whom one finds a small, cord-like body of the uterus, retroverted and often adherent posteriorly, must be severely let alone. I have never seen one of these patients become pregnant whether they were treated or not. Plastic operations on the fallopian tubes, in my experience, hold out very little hope for the cure of sterility. It seems to me that those patients whose tubes become closed because of gonorrheal infection, very often have a better chance if they are not operated upon, for such exudates in time may be absorbed and the tube will become patent. The reactionary exudate which follows an operation is less likely to be absorbed. To my mind it is still a mooted question whether to operate on patients who have fibroid tumors. I removed the fibroid tumors in 9 patients; one became pregnant and was delivered of a normal child, another became pregnant and miscarried at the end of the third month; the others are still sterile. In patients who are sterile and suffering from fibroid tumor of the uterus, if by insufflation I find the tubes open I do not advise operative interference, unless acute symptoms develop, for it is a well-known clinical fact that women who suffer from fibroid tumors of the uterus are more likely to become pregnant between the ages of thirty and forty than they are between the ages of twenty and thirty, and something may be gained by waiting. If, however, I find the tubes closed, I advise operation, for there is nothing to be gained by delay. Fifty-two patients had dilatation of the cervix and the insertion of the stem pessary for the purpose of correcting and enlarging the cervical canal. Eight of these patients became pregnant, one while the stem pessary was in place; the others remained sterile. I never saw a permanent enlargement of the cervical canal after a stem pessary operation. There are many other objections to the stem pessary. In eight patients with unilateral ovarian cysts, the tumors were removed; the other ovary in each of these patients was enlarged and cystic. The menstrual history in these patients remained unchanged, but they all remained sterile. Ovarian tumors in women who are sterile should be removed as soon as possible, because the tumor may act as an irritant to the other ovary, and by an early operation we may be able to save a small portion of the ovary which is less involved and has not, as yet, been destroyed. Three patients suffered from persistent vaginismus. The classical Pozzi operation was performed and they became pregnant shortly after. The real problem that confronts us in the treatment of sterility is in that group of patients which practically presents no anomaly of the genital tract, except possibly a moderate degree of flexion or version.

Dr. Rubin's method of insufflation for the purpose of ascertaining the patency of the fallopian tubes has changed the entire status of sterility and its treatment. We are now able for practical purposes to classify all patients who suffer from primary as well as relative sterility into two general groups: (1) The "clean

group'' or patients who suffer from sterility due to some constitutional disturbance. (2) The ''unclean group'' or those who are still suffering from an inflammatory condition in or about the pelvis. At the Lebanon Hospital, during the past twelve months, we have made 152 examinations by this method. In our series the average rise in the patent cases was 132 mm. and 182 mm. in the closed cases. If oxygen is used, not more than 300 c.c. should be introduced. If carbon dioxide is used, a greater quantity can be introduced. In this series of cases 9, or 59.2 per cent, were positive, that is, air appeared in the abdominal cavity; in 62, or 40.8 per cent, no air was present in the abdominal cavity. As a general proposition, it may be stated that, whenever the air passes into the abdominal cavity through the tubes, they may be considered patent from the standpoint of mechanical obstruction to the passage of traveling spermatozoa. The fallopian tubes may be plugged by some inflammatory exudate or some mucogelatinous substance and still permit the passage of gas under pressure, yet, without artificial distention of the tubes the plugging may act as a barrier to the passage of spermatozoa. The contraindications to this method of examination are acute infections of the vagina or pelvic organs; also it must not be used in the presence of chronic infections, if the patient complains of pain. It should not be performed when the menstrual period is about to appear. Patients who have heart disease should not be subjected to this examination. In this series of examinations the only complications were a case of severe syncope, a case of syncope of lesser degree, and in a patient previously operated on for appendicitis, and later for intestinal obstruction, who had adhesions in the left pelvis, the examination evidently caused sufficient irritation so that the patient developed an acute inflammation of the left fornix, which subsided under palliative treatment. This method of examination should be used in every case in which the sterility is of doubtful origin. Four of these patients did not menstruate after the insufflation and upon examination were found to be pregnant. We do not believe that the occurrence of pregnancy in these patients was purely accidental. We feel that the force of the gas either expelled some mucous plugs or straightened out any kink that might have been present. We are certain that in a short time this method of examination will become a routine in office practice, and no patient will be given a definite opinion as to the cause of her sterility, before the patency of the tubes has been established.

The treatment of sterility consists chiefly in the art of being able to select the patients who are likely to respond to treatment. Those patients in whom we find congenitally defective organs ought to be let alone. On the whole there seems to be a group of patients who are suffering from sterility, who are hopelessly incurable and remain sterile for the rest of their lives, and still wander from doctor to doctor in the hope of selecting a cure. The hope held out to such patients by physicians has a tendency to create a suspicion in the minds of these women as to the integrity and honesty of the medical profession. We must be able to discriminate and select for treatment only those patients in whom we think we can obtain a cure.

DISCUSSION

DR. HARRY ARANOW.—Sterility may be considered in two main groups, namely, those in which the cause is evident, such as dyspareunia, vaginismus, marked stenosis of the cervix and those in which the cause is difficult to ascertain or is found to consist of obstruction in the tubes, maldevelopment or chronic disease of the ovaries which interfere with ovulation without giving any palpable physical signs. I believe the reason we have failed to cure sterility is because we have failed to put our finger on the underlying cause.

Dr. Rongy said cases which had remained sterile for two years after marriage might be considered sterile. I do not think we can consider a patient sterile until three years after marriage. A great many women even without prevention will

not conceive for two years after marriage. I think we should allow three years before deciding that a woman is sterile. Some cases with anteflexion of the cervix are cured by dilatation. I have the same feeling about retroversion if it is not caused by an inflammatory process. The cases in which the sterility is due to inflammatory process are rather hopeless, but those in which no inflammation is present are sometimes helped by reposition and operation. I have the same hopeful feeling about fibroids. A woman of over forty recently consulted me, not because of sterility, but for fibroids which were causing pain by pressure. At operation I found five or six fibroids, some intramural, and a small uterus. That woman became pregnant and was delivered without difficulty though four or five incisions had been made in her uterus. I feel that those cases of sterility that have evidence of being caused by retroversion, or ovarian cyst or fibrosis or stenosis ought to be given the benefit of operation, for some of them may be helped. Of course before operation they should be thoroughly investigated by Dr. Rubin's insufflation method. The examination may be made under the fluoroscope in the office, and then we can answer the question as to the patency of the tubes at once.

One of the most complicated questions we have to consider is sterility. We can examine the cervix and the uterus fairly well, but when it comes to the tubes and ovaries, it is more difficult, and the question of endocrine imbalance may have something to do with the sterility. I think this method of insufflation should be made a routine procedure just as we examine the husband every time before undertaking to operate on a case.

One point Dr. Rongy brought out should be emphasized and that is that the gas may go through places where a spermatozoon cannot pass through.

DR. HERMAN LORBER.—We are probably all of the opinion that prophylaxis has its field of usefulness in the cure of sterility. The general custom of the young graduate providing himself with a set of curettes as his first instruments and using them when and where infection is very likely may be a contributing factor to so many cases of acquired sterility.

The eugenic test of the male and the cured chronic conditions of the prostate would also help to eliminate future possible cases of sterility. In cases of undeveloped uteri much has been done with endocrines and Dr. Hirst had cited cases treated with the galvanic current in which the uterus has almost doubled in size following his treatment.

DR. WILLIAM P. HEALY.—Dr. Rongy has shown that we now have available a very important method of clearing up the question of the patency of the tubes by means of Dr. Rubin's method by the injection of oxygen, and by the method of Dr. Cary of Brooklyn with salt solution. As Dr. Aranow has said, if we have something in the individual case that is pathologic it is well worth while relieving it in order to place the patient in as nearly normal condition as possible before giving up.

In regard to the question of using the stem pessary which Dr. Rongy discouraged, I believe it is a valuable form of treatment in dysmenorrhea and stenosis of the cervical canal and in sterility, not only because it acts as a dilator but because the cervical canal remains dilated thereafter, and also because it helps in the development of the uterus. It acts as a foreign body; the uterus makes an effort to expel it, and in spite of the fact that the pessary may be sutured *in situ* you will find it exceedingly difficult to make the pessary remain in place because the uterus will tend to expel it. That means the uterus has been undergoing mechanical massage, which causes it to increase in size and it is better for the pessary having been there. Of course putting a stem pessary in an inflamed uterus is another thing. The cases must be properly selected. Cases of dysmenorrhea are sometimes permanently cured by the stem pessary.

As to myomectomy in cases of sterility, I have not had good results. Very few have been benefited so far as the sterility is concerned. Occasionally one patient will be cured, but they are so few that they may be ignored. It is better, however, to do a myomectomy no doubt.

Dr. Rongy's paper brings out the necessity of knowing the condition of the tubes before instituting an operation for sterility. He stated that 60 per cent of the cases examined had clean tubes and only 40 per cent showed pathologic lesions needing treatment. That has been our experience; in cases of sterility approximately 60 per cent will be apparently normal and the husband is also normal. It is only in a small proportion of the cases in which conditions exist that we can succeed in curing by operation.

DR. RONGY (closing).—Regarding stenosis in the 152 cases which we insufflated, we used a No. 6 Holtzman syringe.

Regarding retroversion of the congenital type, it is not the uterus but the ovaries that are defective, and you do not correct the function of the ovaries by correcting the retroversion. In 1911, I reported 27 cases in which I used the stem pessary. It is true the stem pessary irritates the uterus and the uterus will expel it, but the reason the woman does not become pregnant is not because the uterus is small; she does not become pregnant because of some other difficulty. You may find the tube one-half the size they should be, or the ovaries hard and full of small cysts. While the uterus may be increased in size by the irritation of the pessary, that does not affect the sterility.

As to myomectomy, my experience coincides with that of Dr. Healy. I can recollect few cases in which I have done a myomectomy which have become pregnant. In a woman who has fibroids, the tumor is of no consequence as a cause of the sterility; it is the disturbance that causes the tumor which is responsible. I had a patient, a doctor's wife who was sterile for three years. She had fibroids which Dr. Cragin said should be removed, and two or three were removed. I said at that time that she would have more fibroids. Last week she came into my office with a fibroid as large as a fist. Women are not sterile as the result of fibroids, but fibroids are the result of sterility.

I have had very little experience with electricity. At one time I spent a considerable sum on electrical apparatus and treated various gynecologic conditions with it, but obtained no results whatever. When you increase the size of the uterus by electrical treatment you do not cure the patient. You may find the tubes patent, the husband well, and the woman having a small uterus; that woman's sterility is not a local condition but a constitutional one, and while we are not prepared to say what the cause of the sterility is, it will be found that it is away from the pelvis, and the sooner we learn this the less operating will be done in patients whose sterility cannot be cured by surgical procedures, and the better it will be for the patient.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

Toxemia of Early Pregnancy: Etiology and Treatment*

Part II: Treatment

BY PAUL TITUS, M.D., F.A.C.S., PITTSBURGH, PA.

THERE are as many, if not more, methods of treatment recommended for nausea and vomiting of early pregnancy as there are ideas regarding the origin of the condition. In all probability this is the result of the very fact that the etiology of all toxemia during pregnancy is still surrounded by so much uncertainty that Zweifel has quite correctly termed it "die Krankheit der Theorien."

Work which would discover the actual cause of toxemia of pregnancy would naturally produce appropriate therapeutic measures with which to combat the condition. At the same time it is not unlikely that successful though empiric treatment offers many clues to the sources of the trouble. A review of the more important methods of treatment of toxemia has, therefore, the double object of reasoning "whys" and gathering together "wherefores."

GENERALLY ACCEPTED METHODS OF TREATMENT

The milder cases of nausea and vomiting are often controlled by simple attention to the bowels, the diet, (DeLee) proper exercise and amusement, as well as sufficient rest (Williams).

The most widely accepted general plan of treatment when the nausea and vomiting has become at all severe consists in the rational and common-sense practice of establishing rest in bed, isolation from friends and relatives, the employment of gastric lavage and purgation, the use of chloral and bromides as sedatives, rectal feedings, and therapeutic abortion as a last resort. With this as a starting point the individual variations in treatment are legion, ranging all the way from organotherapy to pure dietetics.

TREATMENT OF PREDISPOSING PATHOLOGIC CONDITIONS

Many authorities, among whom may be included Williams, DeLee, Hirst, Tweedy and Wrench, and others, are of the opinion that vomiting of pregnancy may originate reflexly from various pathologic disturbances such as retrodisplacements of the gravid uterus or cervical erosions, and base their supposition on the fact that patients have obtained relief from their toxemic symptoms soon after the institution

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of appropriate treatment for these definite conditions. They recommend therefore that such factors be searched for and treated by surgical or other means. While the advisability of correcting gross lesions is freely admitted, Williams asserts it is by no means certain that the psychical effect of such treatment is not responsible for a large part of the benefit derived. Granting also the advantages to be gained from the treatment of lesions such as pyorrhea, tonsil and middle-ear disease, as well as sinus infections, the same reservation is to be made regarding Talbot's idea that a focal infection can be found as the underlying cause of practically all toxemia of pregnancy. Kingman goes so far as to state that appropriate treatment of hyperemesis consists in putting the patient into the knee-chest position, inflating the vagina and then packing it with wool tampons for twenty-four to thirty-six hours, because vomiting is so often due to anteflexion of the uterus with varying degrees of descent upon the pelvic floor.

C. H. Davis regards these as predisposing rather than causative factors, and points out that a carefully taken history will usually reveal any previous gastrointestinal disturbance, nervous disorder or other physical conditions which might make a patient more sensitive to the disturbed metabolism of pregnancy. The physical examination will reveal any source of local irritation or infection and he believes that dental work, removal of infected tonsils, the correction of uterine displacements, or acute cervicitis, should be undertaken merely as an incidental matter in connection with the general handling of a patient.

DIFFERENTIATION BETWEEN VARIOUS TYPES OF VOMITING

It must be recognized that there are several degrees of severity of symptoms, and of these the mild, or so-called "morning sickness" is most commonly seen. Indeed many women, as well as many physicians, have come to look upon this merely as an indication of the existence of a pregnancy, and because they have come to expect it, pay little or no attention to it. Bumm warns us, *a propos* of this that the emesis seen so frequently in hysterical women may readily develop into uncontrollable vomiting. It should, in fact, be more generally known that such vomiting is not necessary during pregnancy, according to Williams, and that it can be controlled by suitable hygienic and dietetic measures.

Women may pass from the "first period" (DuBois) into the "second period" where their vomiting is most distressing, often going rapidly from this stage into the "third period" where marked emaciation, dehydration, jaundice, acidosis, "coffee-ground" vomitus, and prostration are prominent, and death may supervene in spite of any measures which may now be undertaken.

The very fact that bizarre methods of treatment such as dilatation of the cervix recommended by Copeman, the use of electrical batteries, blisters to the spine, the ice-bag of Chapman, and the use of leeches applied to the cervix, have effected cures in apparently hopeless cases, has brought forward the idea first suggested by Kaltenbach that vomiting of pregnancy may be an hysterical manifestation. Kaltenbach even went so far as to state that practically all patients could be controlled by suggestive treatment.

The confusion which resulted from this has undoubtedly been the cause of a certain number of deaths from pernicious vomiting, since

it became the tendency to pursue a waiting policy in the hope that some sudden change for the better would occur. It has seemed quite impossible to distinguish between patients that were apparently equally ill and yet might suddenly begin to improve as compared to those in whom delay beyond a certain point proved fatal, even a therapeutic abortion then being useless.

As a primary essential in treatment, therefore, Williams has attempted by means of the ammonia coefficient to distinguish between toxic and neurotic vomiting, believing as he does that all vomiting of pregnancy may be thus typed. If he can be convinced that the vomiting is neurotic in origin or type, he treats the patient by isolation from sympathetic relatives and friends, gastric lavage and forced feeding, the injection of normal salt solution under the breast using "dull needles," and the constant reiteration to the patient that these unpleasant measures will have to be repeated if there is no improvement. On the other hand, if the ammonia coefficient remains high in spite of forced feeding, he classes the case as one of toxic vomiting and induces abortion without undue delay. In accepting this as proof that neurotic vomiting is a distinct entity it must be remembered that this "suggestive" treatment is not entirely useless in combating an intoxication, especially if it consists in part of rest in bed, glucose and soda by bowel, sedatives, purges, and forced feeding.

DeLee agrees it is more than possible that a neurotic element is the basal cause of vomiting in hysterical or neurotic women, pointing out that in the presence of demonstrable disease the treatment of a displaced uterus or a diseased cervix simply relieves the patient of the peripheral irritant, while the vomiting ceases because the nervous system comes again into equilibrium.

Even the Freudian theory has been dragged in by its long hair through the suggestion of Schwab that a woman with hyperemesis is usually one who unconsciously has no love for her husband, the vomiting in this instance being not a symptom of a disease, but the expression of undesire, unwillingness, aversion and nausea. Death from hyperemesis gravidarum, he says, is a form of suicide, a hunger strike, these women protesting secretly and translating "I will not" into "I cannot." DeLee in abstracting this original article for the 1921 Year Book of Obstetrics, characterizes such notions as absurd.

It is probable that in all toxemia there is an element of neurosis which should be accorded consideration. On the other hand, it is hardly possible that neurotic vomiting as such could exist without any vestige of toxemia. In a given case, however, it is often difficult to say whether the toxemia or the neurosis is uppermost, and it should not be forgotten that lines of treatment successful without any apparent cause and therefore classed as suggestive, may have a reasonable physiologic basis for their success. For example, Williams believes that frequent meals begun before the patient arises in the morning and continued at stated intervals during the day are of benefit largely because of the mental effect which these careful directions have upon the patient. Duncan and Harding, as well as Titus, Hoffmann, and Givens, have shown that the beneficial results from such feedings are to be attributed to the avoidance of any long periods of hunger, or as it might be termed, mild starvation. The former believe that a direct carbohydrate starvation is responsible for hyperemesis gravidarum,

and Harding in a later work points out the similarity between the symptoms supervening before death from this condition and that due to a deprivation of carbohydrate foods in a diabetic. The latter writers maintain that it is due to a combination of an actual carbohydrate starvation plus an increased demand for glycogen on the part of the fetus. Both groups of workers agree that a glycogen deficiency in the maternal liver, whether from the one or both causes, is responsible for practically all toxemia of early pregnancy by lowering individual liver resistance to toxins of whatever origin. That morning sickness is most common follows from the fact that the longest period of fasting in the twenty-four hours is during the night. This is merely a physiologic explanation of the simple fact that frequent meals, by night as well as by day, especially if carbohydrates predominate, will relieve the average case of vomiting of pregnancy, and that the neurosis in this instance is merely incidental.

That a neurosis could be solely responsible for the occurrence of any considerable number of cases can be conclusively proved only by effecting "cures" through the use of placebos alone, being careful that the generally accepted methods of treatment for such toxemia have not been used in conjunction with the spectacular and apparently inexplicable thing which suddenly brings about the "cure." Otherwise the process is too much like that of the patient with pneumonia who had a high fever in spite of all the doctors could do for six long days, when the family dismissed the doctors and called in an osteopath. He gave the patient one treatment, whereupon the fever disappeared that very night and the patient's life was thus saved!

DIETETIC INFLUENCE ON TOXEMIA

In conjunction with the generally accepted methods of rest, isolation, sodium bromide per rectum, gastric lavage, starvation for twenty-four hours, etc., the question of nourishment for the patient is obviously important.

DeLee uses rectal feeding, then dry diet with carbohydrates predominating, during the first few days after the initial period of starvation; Mack advises a milk diet with sodium bromide to be followed by milk plus eggs and zwieback, suggesting a preponderance of carbohydrates for the subsequent days; Tweedy believes that free purgation is the fundamental factor in successfully treating vomiting and proceeds cautiously with food, beginning with peptonized milk, whey, and albumin water, and increasing the amount of food intake very slowly. Shears says that dietetic treatment is less important than one would suppose and permits the personal preference of the patient to have considerable weight in the choice of food.

Duncan and Harding, as well as Titus, Hoffmann, and Givens, believe that frequent feedings of a high carbohydrate content are almost essential in the treatment of vomiting of pregnancy and begin with liquids, whereas Lynch urges absolute restriction of sweets and fruits, giving a diet of proteins with a limited amount of fats in what he terms the hyperacidity group of cases. He urges a dry, solid diet, stating that sweets invariably nauseate, and supplies carbohydrates through the rectal introduction of glucose and soda solution. C. H. Davis urges a middle course by suggesting a dry diet high in carbohydrates and low in fats and proteins.

Practically all writers agree that there should be an initial period of starvation or rest for the stomach, and during this interval attempt to supply nutriment in various forms per rectum. Some are content with the mere use of glucose and soda solution for enteroclysis, while Van Schaick concluded from two successful cases in which he used enemata or the Murphy drip of saline solution that to supply water in large amounts so that it is rapidly absorbed through the intestine will enable the mother to carry the child to term. Dehydration is undoubtedly an important item, but Van Schaick's assumption from two cases is scarcely conclusive.

Bacon has gone into the question of nutrient enemata in detail. He says that in this way all essential food elements can be supplied—water, salts, glucose, amino-acids and vitamins, while the deficiency in nitrogenous foods can be made up in part by giving an excess of glucose, and by alcohol. The latter he considers of great importance, and he adds that a calcium salt should also be supplied. Rectal feedings are discontinued gradually as stomach feedings are increased. His caloric values have been painstakingly worked out, as well as the various elements in the proportions which he considers essential, so that reference to his original article is well worth while.

Adair also insists that the proper treatment for vomiting of pregnancy has as its prime object the furnishing of food and fluid. In order to reduce the demands to a minimum, it is necessary to have absolute rest for mind and body. Supplying food is much more difficult as a rule than the administration of fluid, but in the main it should consist of carbohydrates and fats with a small amount of proteins.

It is perfectly obvious, of course, that carbohydrate metabolism is much simpler than that of proteins, although the latter can be broken up within the body into energy producing elements by a comparatively intricate process. From the standpoint of body chemistry, therefore, this use of carbohydrates is more logical than to utilize proteins, although proteins are by no means entirely unserviceable.

As long ago as 1913 LeLornier recommended subcutaneous infusions of sugar solution in addition to the rectal infusions during the first few days of treatment.

Considerable discussion has arisen over the similarity between the clinical pictures of pernicious vomiting of pregnancy and prolonged starvation. Underhill and Rand, in discussing Williams' work on the significance of the ammonia coefficient, emphasized this resemblance. They claim that little change can be detected in the nitrogenous urinary constituents so long as the carbohydrate store is not depleted and that this does not happen as rapidly as has been assumed. As soon, however, as the protein of the body is drawn on to furnish carbohydrate, acidosis appears and the ammonia nitrogen suddenly increases. They advised, therefore, that the patient be supplied with carbohydrates by rectal enemata, their recommendation thus being physiologic rather than empiric. Benefit was obtained in a number of cases and they reasoned that it was because dextrose had been supplied solely for the energy obtained in its combustion. Their argument is partly erroneous because the dextrose supplied under such circumstances is only partly burned while a large part of it is stored in the liver, engorging and enriching its depleted cells with sugar whereupon a reserve supply is established and the liver is thus enabled the better to function in its detoxicating

capacity. They say that supplying carbohydrate to the body should not affect the ammonia output in the urine, if the ammonia content of the urine is an evidence that the liver is out of function from irremedial lesions. Since that time, however, experimental evidence has been adduced, as described in Part I of this review, to the effect that a glycogen depletion of the liver from starvation or other causes is the explanation of the pathological liver lesions to be seen in these cases, and that to supply carbohydrates will cause a histological restoration of the damaged liver lobules.

Titus and Givens have confirmed this experimental evidence by clinical investigations, and recommend intravenous injections of large quantities of glucose in solution for pernicious vomiting as well as for eclampsia. They show that after such treatment, liver sections from fatal cases of both acute yellow atrophy and eclampsia have been restored so far toward normal that from them alone a pathologist could not interpret the specimens as belonging to these distinct clinical conditions from which the patients had died.

FLUID ABSORPTION FROM THE BOWEL

Practically all authorities agree that dehydration is an important factor in the progress of toxemia, and most writers urge the use of various fluids administered per rectum. Plain tap water may be used, although many prefer normal salt solution. Ringer's solution has been repeatedly advised and LeLornier says that one may choose between glucose and soda solution and Ringer's solution with equally good results. The tidal stand of glucose and soda solution utilized by Polak in his post-operative work probably effects the greatest amount of absorption with a minimum of discomfort to the patient.

It is hardly necessary to repeat that bromides or other sedatives may be administered in the fluid introduced into the rectum.

SEROLOGICAL TREATMENT

Murray speaks of the results obtained by Mayer and Freund who have advocated the injection of serum from normal pregnant women. Austin has had beneficial results in hyperemesis from such use of serum, but he varies the suggestion made originally, according to Williams, by Fieux and Dantin, in that he is careful to obtain the serum from a nontoxic woman whose pregnancy is of the same duration as that of the patient. Melgar has had favorable results from these methods of treatment, but was disappointed in the use of normal horse serum. This latter treatment has been variously recommended and referred to recently by Hannah in discussing the work of Newman.

Mack advises a trial of serum therapy but inclines to the opinion that its psychic effect on the patient is its greatest influence.

ORGANOTHERAPY

Lange, as well as Nicholson, believing that the trouble results from a failure of the thyroid to enlarge, administers thyroid extract. This has been more recently suggested again by Siegmund.

Zulogoa, as well as Cerecedo, and also Rebaudi, have attributed hyperemesis to some fault on the part of the adrenal glands. They have therefore considered the administration of adrenalin appropriate.

Eugene Cary recommends the use of 10 to 15 grains of desiccated placenta daily.

J. C. Hirst has attracted considerable attention to the use of corpus luteum extract for pernicious vomiting and many clinicians have followed his example with widely varying results. For instance, in 1919 he reported 111 cases of nausea and vomiting, 99 of which were favorably influenced by hypodermic intramuscular injections of commercial corpus luteum extract. More recently he has advised the intravenous injection of the extract. He now prefers this method of administration but in this paper gives no figures from which one can observe his results. After Hirst's first and preliminary report of five cases, P. J. Carter gave the method a trial and was able to present 20 consecutive cases without a failure. He gave the extract by hypodermic injection, and was most enthusiastic about the treatment. Quigley treated a series of 17 patients with relief for 12, while in Hirschfield's series of 15 patients only one showed no improvement.

DeLee in commenting on these results in the 1921 Year Book of Obstetrics states that he has used corpus luteum for hyperemesis by mouth and hypodermatically with varying success. Only half of his patients were benefited and in the toxemic varieties it has thus far failed entirely. Davis has seen little or no benefit from its use. In general, opinions on its value are still given with considerable reserve.

THERAPEUTIC ABORTION

Practically every textbook of obstetrics advises therapeutic abortion as means of last resort in profound and uncontrollable vomiting of pregnancy. A study of series of cases reported from various well-conducted clinics shows how infrequently this extreme means is necessary, but many patients have undoubtedly been lost who could have been saved had the operation not been unduly delayed.

The greatest conservatism must be observed, both in deciding to operate and in the method chosen, because the condition of patients actually needing a therapeutic abortion is usually grave.

RESUME OF TREATMENT

A brief summary of the general lines of successful treatment for hyperemesis gravidarum embraces (1) the ruling out of any independent disease such as gastrointestinal disturbances either acute or chronic, gall bladder disease, or appendicitis; (2) the removal of focal infections in the teeth, or tonsils, or elsewhere, and the correction of pelvic abnormalities such as uterine displacements or cervical erosions; (3) as careful and accurate a classification of the condition as possible, so that the element of neurosis may be given attention, and that the "period" (DuBois), or degree of severity, of the hyperemesis may be properly appreciated. (4) Rest is important at any stage, since it conserves energy, and (5) isolation from visitors is a form of rest. (6) The use of bromides and chloral by mouth or by bowel is helpful in obtaining absolute relaxation, while (7) gastric lavage is of value because it clears away mucus and food residue, at the same time permitting (8) the introduction of saline purges through the stomach tube. A period of (9) abstinence from food and water by mouth should be given to rest the revolting stomach, during which time (10) rectal

feeding should be resorted to in order to combat both starvation and dehydration. Water, saline, glucose and soda solution, or nutritive solutions may be injected either by the "Murphy drip" or the "tidal stand" methods. (11) Subcutaneous injections of salt solution, as well as glucose solution have been utilized, and (12) intravenous injection of glucose dissolved in distilled water is also recommended.

With the return of stomach tolerance and improvement of the patient, (13) mouth feeding is cautiously resumed and one proceeds to give either liquids, or solids, or to adopt a middle course combining the two according to experience and preference. Carbohydrates should predominate in these feedings from the standpoint of simple metabolism although proteins may be more "tasty" and acceptable to the nauseated patient, being well though less readily utilized.

It is necessary to exercise keen judgment over all patients who fail to show improvement because a waiting policy may be prolonged beyond the danger point. In the presence of jaundice, epigastric pain, marked acidosis, "coffee-ground" or bloody vomitus, delirium, coma, increased pulse rate, etc., it is customary to (14) induce therapeutic abortion, although as a general thing this should be done before the patient has reached this stage of the disease, else even the abortion may be too late to save her life.

Having arrived, with the help of consultants, at a decision to empty the uterus, this should be done in the most conservative manner possible, using scopolamine and morphine to aid in the anesthesia. In early cases the uterus may be dilated and emptied at one operation, or vaginal anterior hysterotomy may be chosen in preference if the cervix cannot be readily dilated or if haste is essential.

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Selected Abstracts

The Cervix

Hollender: The Treatment of Cervicitis and Endocervicitis with Bismuth Paste Injections. Illinois Medical Journal, 1921, xl, 323.

The author draws his conclusions from a series of 600 cases of endocervicitis treated with bismuth paste according to Beck's method. The therapeutic basis is a local leucocytosis set up by the bismuth injections which destroys the bacteria and heals the inflamed area.

Cancer, tuberculosis and syphilis as etiological factors are first excluded in each case. Deep-seated endometritis, pregnancy, malpositions and tubal involvement contraindicate the injection of bismuth into the cavity of the uterus. The cervical canal is cleaned by the coagulation of its mucous and purulent contents with 40 per cent silver nitrate. Following this, about one dram of 10 per cent bismuth subnitrate is injected without force into the uterus with a glass (urethral tip) syringe. Only the gentlest force is used in the injection. Some of the paste is then packed about the cervix and held in place by a tampon. At the end of twelve hours the tampon is removed and the patient takes a hot saline douche. This treatment is continued at intervals of from two to four days.

About 80 per cent of the cases were quickly cured by this method. No mention is made of the dangers of this method in the acute stages of cervical gonorrhea.

H. W. Shutter.

Matthews: A Study of Chronic Endocervicitis. Surgery, Gynecology and Obstetrics, 1921, xxxii, 249.

Chronic endocervicitis is a very common and intractable disease which, Matthews thinks, has far greater possibilities in the production of pelvic disease than has heretofore been supposed. Since, in the majority of cases, palliative measures are futile, he advises removal of the infected area by a method similar to Sturmdorf's. The infected area is outlined with scalpel, the mucosa of the portio is dissected off for a distance of 3 to 4 cm., forming a circular cuff. The infected area up to the internal os is then coned out and the flap of mucosa sewed into place. While the infected mucosa and submucosa must be thoroughly removed, care is taken not to remove any more of the muscularis than is absolutely necessary.

Though it is conceded that this is not a perfect method, it has many advantages over a cervical amputation. The results obtained with it are at least as good. In a series of 200 cases treated by this method, 64 per cent were cured, 28 per cent improved and only 8 per cent remained unimproved. R. E. Wobus.

Donay: Surgical Treatment of Endocervicitis. Gynécologie et Obstétrique, 1921, iv, 137.

The frequency of lack of union by primary intention and cicatrization following the Schroeder operation and its modifications is emphasized by the author. He then

dwells upon the operation described by Matthews of Brooklyn, a method founded on the work of Sturmdorf of New York, and Curtis of Chicago, similar in aim to the operation of Pouëy brought out in 1901. It consists in a circular incision of the cervix with a loosening of the vaginal mucosa of the cervix for a distance of from 3 to 4 cm., to permit of the covering of the bed of the endocervical tissue. The diseased endocervical mucosa is removed in a cone-shaped mass having for its apex the internal os and extending down to the musculature of the cervix. The free edge of the vaginal mucosa of the cervix is then brought in apposition with the uterine mucosa at the internal os by two U sutures, one anterior and the other posterior, which penetrate the whole thickness of the cervix from within outward and are tied on the vaginal surface of the cervix. This maneuver places the vaginal mucosa in contact with the mucosa at the bottom of the cervical canal, covers the denuded area and substitutes healthy vaginal mucosa for infected endocervical mucosa.

R. T. LA VAKE.

Magid: Obstetrical End Results of the Tracheloplastic Operation. New York Medical Journal, 1921, cxiv, 387.

The author compares the end results of the Sturmdorf tracheloplastic operation with those of trachelorrhaphy and of cervical amputation. Leonard's review of the Hopkins series demonstrated that trachelorrhaphy did not relieve the endocervicitis which was the cause of symptoms, while a curative amputation was followed in four fifths of the cases by sterility. Half of the patients who became pregnant failed to carry to term, the remainder suffered severe cervical dystocia. Sturmdorf's tracheloplasty, on the other hand, cures the endocervicitis by removing the infected cervical mucosa, yet does not interfere with the cervical musculature and, therefore, has no bad effect on the possibility of future conception, pregnancy or labor. This operation may be justifiably performed during the childbearing period. The author quotes nine personal cases and mentions numerous successful deliveries by colleagues to support his contentions.

MARGARET SCHULZE.

Heineberg: Diseases of the Cervix Uteri. New York Medical Journal, 1920, cxii, 706.

The ease with which the cervix may be amputated has frequently led to its removal without due consideration of other possible means of restoring it to a healthy condition. To insure complete removal of the diseased cervical mucosa and eroded area in badly diseased cervices, the internal incision in the formation of the flaps must be made so high across the mucous membrane of the cervical canal that the canal or internal os may be impaired. The latter may be left in a state of wide dilatation, the former may be tightly constricted by a ring of cicatrix perpendicular to the long axis of the cervix formed at the edges of the apposed flaps. A permanently dilated internal os favors infection of the uterine cavity with production of a leucorrheal discharge which is more difficult to cure than that which resulted from the preexisting cervical disease. Both produce unfavorable conditions for the retention of the impregnated ovum in the uterine cavity. Leonard has reported abortion or premature labor in 55 per cent of the pregnancies in a series of cases following amputations of the cervix.

Stenosis of the cervical canal produced by a dense ring of scar tissue formed along the edges of the flaps may obstruct the flow of menstrual discharge and be the cause of dysmenorrhea. Such a cicatricial ring may produce a prolonged and exhausting labor and such a history of succeeding difficult labor was found in nearly 70 per cent of Leonard's cases.

To reduce the amount of cervical tissue which must be removed, the author advises preliminary treatment. The tenacious cervical discharge is first removed by a

mild alkaline solution, the mucous membrane is then treated with 50 per cent silver nitrate solution applied every 3 to 4 days. If the cervix is large and boggy, the applications are supplemented with boroglycerid tampons until the cervix is reduced in size. The patient is given an alkaline douche. In from three to six months, the cervix is markedly reduced in size, the erosion gradually decreased in area, the discharge is lessened in amount and has resumed its clear mucoid character. In more than half the cases, medical treatment alone was sufficient to cure the existing cervical disease. In most of the others, either trachelorrhaphy or moderate amputation restored the cervix to a practically normal state. MARGARET SCHULZE.

Book Reviews

Gynecology.—BROOKE M. ANSPACH, M.D., Associate in Gynecology, University of Pennsylvania. With an introduction by JOHN G. CLARK, M.D. 526 illustrations. Philadelphia and London, J. B. Lippincott Company.

In beginning a belated notice of this most readable book, the writer begs leave to make the personal confession that it is a labor of love, which, as one of the "old guard" of gynecology he undertakes in a somewhat different spirit from the ordinary perfunctory reviewer. As one who has had the honor of reviewing Emmet, Thomas, and all the works of the "giants of those days", it is really stimulating to catch the pungent taste of a new American monograph and to recognize how old and well-known truths are revivified in passing through the mind of a modern teacher, truly characterized in Dr. Clark's admirable introduction, as "well-balanced." Whether it is better adapted to the student than to the general practitioner is a question to be determined by those who are more familiar with the advanced medical teaching of the present day. It is certainly difficult to find any subject, directly or remotely connected with pelvic disease, which has not been touched and freshened by the text and illustrations. To the writer it reflects perfectly the spirit of modern gynecology, as compared with the old, when the study of pelvic disease "smoked of the lamp" and dealt with theory more than with facts, and refutes the oft-repeated criticism of the general surgeon that gynecology is a "narrow specialty", crystallized and no longer progressive.

The arrangement of the subject matter after the classical introductory chapters on embryology, anatomy and physiology is certainly novel and, it must be confessed, a little confusing to one familiar with an old-fashioned table of contents. The author jumps around a bit, though he omits nothing. It may seem best to him in the next edition to condense somewhat by including under their natural headings subjects which now seem to bob up in unsuspected places, leading the inexperienced to think that they are "after-thoughts."

However the conservative may question the propriety of including under the caption "gynecology" diseases of the abdominal viscera and their operative treatment (the old and still active criticism of the general surgeon), the modern reader must recognize the fact that this is the essential element in the new and broader view of a specialty which has grown, and will continue to grow, since it has a solid foundation in pathology and long ago ceased to apologize for its *raison d'être*. The only criticism is,—is not such an extended review of abdominal diseases confusing to the student unless it is closely linked up with his studies in general

surgery? The weak point in the old gynecology was that it was divorced from obstetrics, hence the outworn theories of traumatic lesions, which we recognized after they had occurred and not *when* and *how* were caused. The author shows this clearly in the chapter on physiology (p. 75-81).

Chapters VI to VIII deserve careful study, not only by the student but by all who teach. Chapter IX, on examination of the urinary organs, is most thorough and exhaustive,—too formidable for the student and general practitioner, one would think, who would do better to refer such cases to the urologist. Under the chapter on diseases of the external genitals the author struggles manfully with pruritus vulvae, the *bête noir* of the gynecologist, and, after enumerating the familiar list of "sure cures", wisely concludes that "in some cases pruritus cannot be ascribed to any demonstrable affection." Injuries of the perineum and their results (Chapter XIII) are well handled and illustrated. Personally we would be glad to see the term "perineum" eliminated in favor of "pelvic floor" and more attention paid to lesions of the fascia, rather than of the muscles, neither do we regard Hegar's and Emmet's operations as modern.

Notwithstanding the modern teaching of locking up the bowels for a week or more after operations for complete laceration we have seen too many failures in the best hands to favor this teaching, which dates back to the time of Emmet. It does not seem to be dictated by common sense, even if it is "scientific". Of the cystocele operations described we are not inclined to regard the Martin and Sänger operations as modern, neither do we regard Watkin's interposition operation as comparable with Goffe's, the modified Mayo's or, above all, the ingenious and rational overlapping of the fascia devised by Bissell. Doubtless there is room for all, but the routine follow-up of such cases proves that "by their fruits ye shall know them."

Under diseases of the cervix (Chapter XIV) we note with surprise the brief reference to the pathology and treatment of endocervicitis. Surely Sturmdorf's and Bonney's operations are preferable to amputation, or rather excision, even in obstinate cases. There is moreover no reference to these procedures in the bibliography. The sections on laceration of the cervix are equally disappointing; in this day we would not expect to read "except where the indications for operation are urgent (!) * * * it is a good plan to try palliative measures before resorting to operative treatment." We could wish that more stress had been laid upon the importance of laceration and erosion as a causal factor in the development of "cancer." Some of the last words that the reviewer heard from the lips of Dr. T. A. Emmet were that he believed that this was his most important contribution to gynecology and that he would advise letting a lacerated cervix alone, or else amputating it promptly. Under the section on trachelotomy (p. 234) we note the expression "high" as compared with "low" amputation, a difference that cannot be too strongly emphasized from the standpoint of the obstetrician, to whom the former procedure is anathema.

Chapter XV, on displacements of the uterus, is clear and instructive. We note with approval here, as elsewhere, the author's skepticism with reference to the frequency of "various reflex symptoms",—our old cloak of ignorance. The operations, especially Simpson's, are briefly, but clearly described and illustrated. In the operative treatment of complete procidentia the author inclines rather to fixation-methods and to disregard the restoration of the lower fascial supports. It is comforting to one of the old school to find that such a progressive teacher does not discard entirely the humble pessary, which has no place in the armamentarium of many gynecologists, who view their specialty as essentially surgical. The freshening influence of the author's mind is evident by the way in which he describes the simple operation of curettement (not "curetment" or "curetage") on page

289, and incidentally in the section on perforation of the uterus on page 287. After all is it not a good test of originality to be able to put an old theme in a new light?

Chapter XVII, on myomata of the uterus, is excellent and the accompanying illustrations are a joy to the eye. We note many interesting practical hints which we would quote if space permitted. "At the present time," says the author on page 310, "the weight of evidence is against the use of the Röntgen ray or radium as curative agents in cases of myoma uteri, except under certain conditions." "Hysteromyomectomy is the operation of necessity in bad (?) cases; myomectomy is the operation of choice in good operative risks with favorably situated tumors." (This statement on page 312 is a little ambiguous.) He favors supravaginal amputation over panhysterectomy,—unless there is an "evidence of malignant complications" after amputation. With regard to the treatment of the ovaries we must agree with the wise conclusion that an ovary should either be let alone (not resected), or removed entirely.

In the chapter on malignant tumors of the uterus we note the author's preference for the radical operation in early cases and his advocacy of the Percy method in the treatment of inoperable cases. It is only fair to mention that both procedures seem to be losing ground in the light of more extended experience.

Diseases of the tubes (including ectopic) and of the ovaries (Chapters XIX and XX) are modern in text and illustrations, though the pathology is somewhat condensed. We heartily agree with the author that so-called "chronic" oophoritis is to be regarded usually as an "end-result" rather than an inflammatory process *per se*. The old nomenclature was a stumbling block to the student, to whom connective tissue was an old friend until the pathologists made use of it to bolster up their theories of so-called "chronic inflammation." Among minor slips one notes the scant attention paid to prolapse of the ovary (page 409) and its treatment. We doubt the statement that "any of the operations for suspension of the uterus will correct a coincident displacement of the ovary." Chapter XXI, on pelvic inflammatory disease, shows how easily and naturally the author deals with a subject which has been so frequently mishandled and rendered confusing to the beginner. We recommend page 423 to any practitioner who still has doubts as to the proper treatment of intrauterine infection. "Intrauterine douching and curetting are meddlesome and dangerous."

Cellulitis (our old enemy) has been robbed of its terrors to the distracted student of Thomas and Emmet by modern pathology and we now know that old cicatrices, "localized indurations", etc., are not dangerous foci which "light up" possible acute inflammation. Chapters XXII to XXV deal with diseases of the urinary tract from the meatus to the kidney. (There is a curious little lost child sandwiched in between them—Chapter XXIV, on urinary fistula—and leaves nothing to be desired.) Thence we pass to an ambitious general survey (Chapter XXVI) of the abdominal viscera, from appendicitis through intestinal stasis and enteroptosis to diverticulitis, the aim being to give the student an idea of the varied extrapelvic conditions which are related to, or associated with, pelvic disorders. One cannot avoid the hope that in succeeding editions (we expect many) this chapter will be placed near the end of the book, as it interrupts the natural sequence in its present position.

The chapter on backache (XXVIII) deserves careful study by all who are familiar with the work of the writers mentioned in the bibliography, especially Dickinson and Reynolds, in our own department. There could be no more striking commentary on the fact that gynecology has traveled far since the time when backache and various so-called "reflex" symptoms were explained (to

the satisfaction of the doctor, if not of the patient) by the presence of a lacerated cervix or retroverted uterus.

Chapters XXIX—XXXI, on gonorrhea, tuberculosis and syphilis of the generative organs, seem rather lonely in their present situation. Perhaps that is why they are grouped together, but why they are interposed between backache and disorders of menstruation is not clear. The latter subject is treated fully and judiciously, especially dysmenorrhea of the so-called "obstructive" type, usually dismissed with some dogmatic statement which does not appeal to the scientific mind. The sections on the menopause—normal and abnormal—are thoroughly modern. The difference in the action of radium in menorrhagia and metrorrhagia is properly accentuated. Endocrines are not overlooked. The succeeding chapter on sterility is full and satisfactory. The author adheres to the theory that the ovum is always impregnated in the tube—"usually in the outer third" (?) He believes that exploratory incision may be the ultimate resort in cases in which intrapelvic adhesions are suspected, with the consent of the patient and her husband. On the whole he is wisely conservative. It would be interesting to know how much more one will know about this obscure subject fifty years hence.

Chapters XXXV to XXXVIII deal with operative technic, pre- and postoperative treatment, and complications, and deserve careful study. They compare most favorably with similar chapters in recent works on gynecology. Chapter XXXIX is in some respects a repetition of former matter and might be introduced earlier in the book with advantage.

Radium and Röntgen ray therapy is new and illuminating. The indications and contraindications of radiation are clearly stated. In cancer of the uterus the author favors radiation just before operation. It is not the procedure of choice in the early and distinctly operable stage. In borderline cases radium only should be used. Its postoperative application he dismisses as "not very successful." More than half of the inoperable cases are benefited as regards the relief of pain, hemorrhage and foul discharge. In "benign" uterine hemorrhage the use of radium is nearly always beneficial.

In this cursory review of a work which has the essential qualities of a "best seller" (to use a common phrase, applicable to ephemeral literature) we may have seemed to be hypercritical with regard to its unusual scope and the unorthodox arrangement of the subject matter. Doubtless some of these criticisms may be considered in another edition, which we expect will appear not long after this belated notice. In concluding with our approval of the careful work shown in the preparation of the table of contents, the index and the bibliography, we voice our unqualified approval of the book as a whole and congratulate the author on the offspring of his brain, which is "eminently viable." H. C. Coe, M.D.

ERRATA

In printing the paper of F. F. Snyder and G. W. Corner in the April number an error was made in the table of specimens, lines 4-6 on page 362. The table should read:

Nonpregnant: First to third day of cycle, 4 specimens; fourth to seventh day, 5; eighth to tenth day, 4; tenth to fifteenth day, 3; fifteenth to twentieth day, 2. Pregnant blastocysts in uterus, 1; embryos of 17-18 days, 2.